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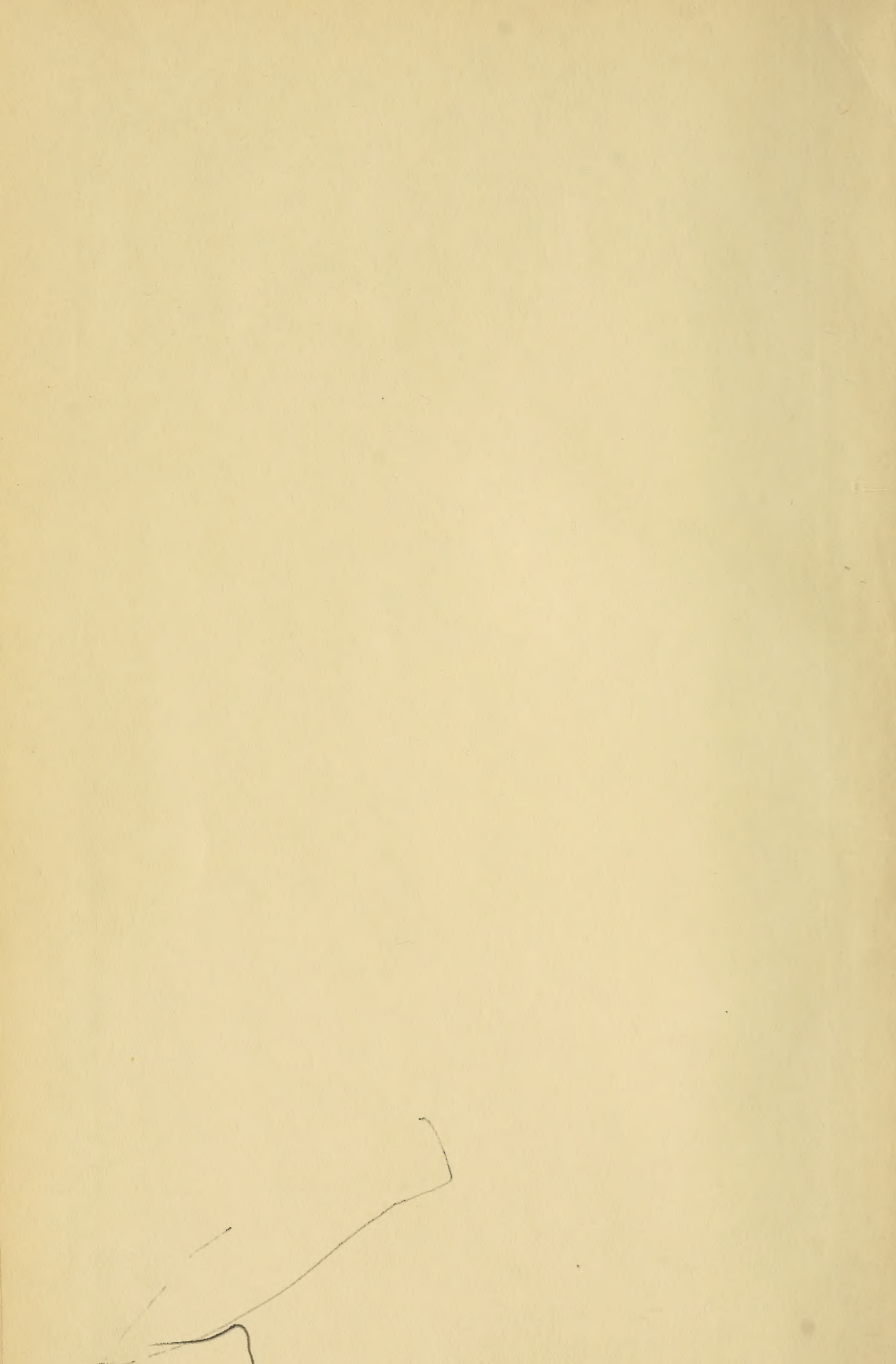
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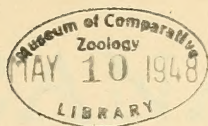


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The CANADIAN FIELD-NATURALIST

Volume 62

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The CANADIAN FIELD-NATURALIST

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No. 1

NOTES ON THE COUNTRY, BIRDS AND MAMMALS WEST OF HUDSON BAY BETWEEN REINDEER AND BAKER LAKES.¹

By T. H. MANNING
Ottawa, Ont.

INTRODUCTION

IN THE SUMMER of 1945, my wife and I formed one of the four parties from the Geodetic Service of Canada which were establishing astronomical control positions for aerial survey in the region west of Hudson Bay. We worked through a strip of country from a point a little east of Reindeer Lake to just north of Chesterfield Inlet. The other parties were to the west of us. All our movements between stations were by a Norseman aircraft piloted by F/L W. K. Carr, D.F.C. We returned from Baker Lake to The Pas in a Canso aircraft, making a short stop at a temporary R.C.A.F. base on the Kazan River. When held up by bad weather or the late break-up of ice on the lakes ahead, there was opportunity to make collections of, and observations on the birds and mammals. These collections have been purchased by the Royal Ontario Museum and the National Museum respectively.

In 1930, Porsild (1936) made an investigation of the reindeer grazing conditions in the Keewatin district. He has kindly allowed me to examine and use his manuscript notes on the birds he saw about the upper Tha-anne River which he visited by plane (July 11-12), and in the Yathkyed Lake and lower Kazan River areas. These notes were also used by Clarke (1938), and I have included only the extracts which were not published in Clarke's more general account, to which the reader is also referred for a bibliography and a summary of the birds and mammals of the surrounding regions.

A small collection of birds and mammals was made in the Yathkyed Lake area by Peter Freuchen and Helge Bangsted (Degerbol and Freuchen 1935, and Herring 1937). Sutton (1931) gives a few notes on the birds between

Eskimo Point and Churchill on his journey down the coast between August 19 and September 2, and a thorough account of the birds of Churchill is given by Taverner and Sutton (1934). An earlier summary of the birds and mammals of Keewatin (including what is now northern Manitoba and Ontario) was made by Preble (1902).

Except at Baker Lake where several small casual collections have been made, Porsild's two specimens and notes from the upper Tha-anne River appear to be the only faunal records from the vicinity of the strip of country in which we worked.

Since the reports of Clarke (1938) and Taverner and Sutton (1934), no work on the fauna has been done between the Hudson Bay coast on the east and the Great Slave-Athabasca region in the west. A new general survey of the fauna is therefore unwarranted, and in the present paper reference will usually be made only to the species actually seen by me. Since this was only a spare time study and the periods spent at most of the stations were very short, it is clear that the following lists will not be complete.

I am indebted to Dr. R. M. Anderson and Dr. A. L. Rand for assistance and advice in the identification of specimens and to Mr. A. E. Porsild for the use of his manuscript notes on the birds as mentioned above. My wife has given valuable assistance in recording my notes and labeling specimens in the field as well as in the preparation of the manuscript.

DESCRIPTION OF PLACES VISITED

¹ Eyrie Lake. June 14-16. 1260 feet above sea level². The land in the vicinity of Eyrie Lake is flat with small, rounded hills and

²) Numbers refer to location on map.

³) This and the following altitudes are thought to be within 60 feet of the true height.

¹) Received for publication May, 1946.

ridges rising only about 50 feet above the surface of the lake.

Except for small marshes, the country was covered by spruce forest with occasional patches (2 to 3 square miles each) of white birch. There were also isolated birches amongst the spruce especially near the water. A few jack pines grew on top of a dry, 20-foot ridge close to camp. On this ridge and on other dry areas the trees were spaced sufficiently far apart to admit comfortable walking with only an occasional detour to avoid deadfalls, and the Labrador tea of the wetter places was replaced by a nearly continuous growth of caribou moss.

When we left The Pas the trees were in almost full leaf, but the birch at Eyrie Lake showed hardly a sign of green.

Eyrie Lake and others in the neighbourhood were rather shallow, and probably for that reason were almost entirely free from ice, though Reindeer Lake, 35 miles to the west was still largely ice-covered. At The Pas, Lake Atikameg (locally known as Clearwater Lake) was covered by an almost continuous, though rotten sheet of ice until about June 12th, but the shallow, muddy Root and Rocky lakes were quite warm on June 8.

2. **North end of Big Sand Lake.** June 16-19. 1060 feet above sea level. Our camp at Big Sand Lake was on the north side of a large island which cut off an ice-free portion of the lake from the main southern section which was still covered by a nearly continuous sheet of ice. Perhaps because of the proximity of this ice, the vegetation was considerably more backward than at Eyrie Lake, and even the alder and willow were without a vestige of green. There may have been jack pine on the hills which rose about 60 feet above the lake, but in the vicinity of the camp the land was too damp. A few birch grew scattered amongst the spruce. On this damp ground there was a profusion of undergrowth, Labrador tea, and deadfalls which made walking in the neighbourhood of the lake shore extremely difficult.

3. **Neck Lake.** June 19-22. 840 feet above sea level. The ground in the vicinity of our camp was mostly damp. It supported a growth of Labrador tea and sphagnum moss

with small, scattered patches of caribou lichen. There were larger patches towards the hill tops, 30 to 50 feet above the lake. The forest area was continuous, but the trees were smaller and farther apart than at the two previous stations. The largest spruce trees grew around the edge of the lake where there were also occasional white birch, but few of either species grew to more than 8 inches in diameter. On some of the hillsides more than half the trees had died before reaching a diameter of 3 inches, owing perhaps to the poorness of the soil. A few small (2 to 3 feet high) tamaracks were just starting to sprout leaves. The birch were bare of leaves when we arrived but were showing green when we left on June 19. Neck Lake was completely free from ice, but the larger Tadoule Lake, a few miles to the north-east, was still solidly covered.

4. **Sandhill Lake.** June 23-July 6. 900 feet above sea level. When we arrived at Sandhill Lake on June 22nd, it was the only lake within a radius of 15 or 20 miles sufficiently clear of ice to permit landing. There were still patches of snow where it had drifted deep amongst the trees. About 20 miles farther north all but the very smallest lakes were frozen, and there were numerous patches of snow. The line between the ice-free lakes (except for a few large ones) and the almost completely ice bound conditions, corresponded to the tree line, and occupied much the same transition area as that between the first patches of barrens and the last patches of trees.

When we arrived at Sandhill Lake, the white birch, willow, alder and tamarack showed scarcely any signs of spring. Until the 30th June, the weather remained cold and there was no advance in the vegetation; after that a few very warm days rapidly brought out the green on all the trees except the white birch, and covered the barren areas with the white bloom of the bake-apple plant.

About 80 per cent of the country around Sandhill Lake was forested with black spruce and patches of tamarack. White birch grew only on a long, narrow esker running across the lake and on the top of some barren sand and gravel moraines which were the highest hills (60 feet) in the immediate vicinity — both surprisingly exposed positions for a species at the northern extremity of its range. For the most part, the spruce was sufficiently far apart to permit easy walking, and much of the dryer ground had a park-like appear-

¹) When we arrived at The Pas, the spring was, and had been, about one to two weeks later than normal. The late break-up was general throughout northern Manitoba and Keewatin, and I think the vegetation was correspondingly late coming into leaf at all our stations. The summer, however, was fine and not unusually cold.

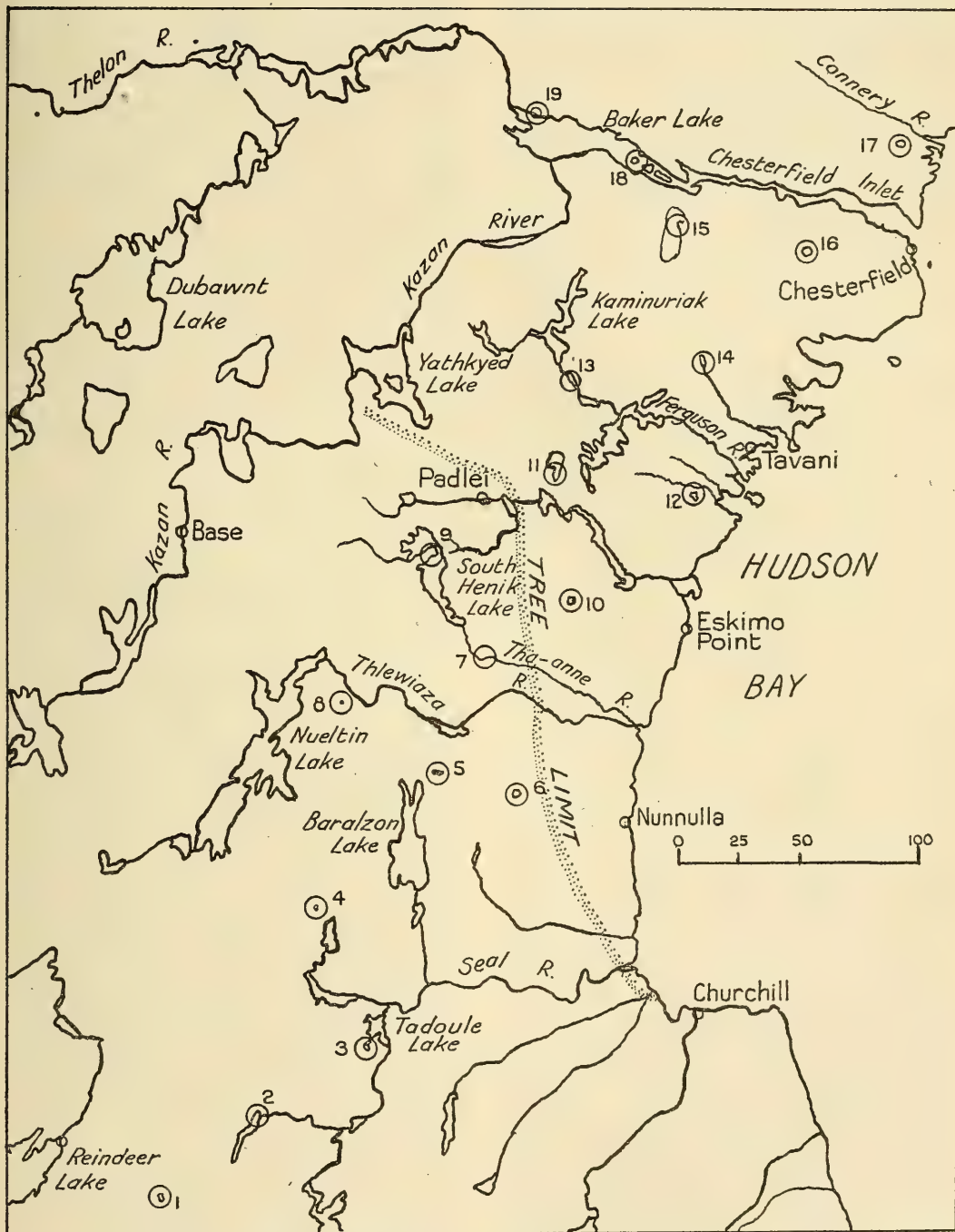


FIG. 1. Map of Reindeer Lake-Baker Lake area. For index to numbers representing localities see pages 1-6.

ance, with a carpet of caribou lichen taking the place of grass. In the damp areas, both forested and barren, the lichens were replaced by sphagnum mosses and Labrador tea, the latter growing with smaller leaves where not sheltered by trees.

About an equal area of dry and marsh land was barren. Scrubby spruce grew around the edges of the latter, and frequently appeared to be encroaching, but in both dry and wet situations, patches of dead and fallen trees showed an equal retreat of the forest. In some of the dry areas where trees were absent or very scattered, dwarf birch grew thickly to a height of about $2\frac{1}{2}$ feet.

5. **Malaher Lake.** July 6-14. 650 feet above sea level. Between the time of our arrival and departure from Sandhill Lake there was a great change in the condition of the ice to the north, and on July 6, we found Malaher Lake (about 6×1 miles in area) and similar-sized lakes completely free from ice. The vegetation at Malaher Lake was considerably less advanced than at Sandhill Lake. Dwarf birch and alder and willow were just breaking into leaf, and a few of the bake-apple flowers were opening, but from a distance the tamarack woods looked brown and dead. When we moved on July 14th eight days later, the tamarack was green, and the dwarf birch was almost in full leaf.

In the Malaher Lake region, patches of woodland occupied about the same areas as did the patches of barrens at Sandhill Lake (i. e. 20 per cent), but between the two lakes there were some areas even more sparsely wooded. Approximately two-thirds of the trees within 10 miles of the station were tamarack; the remainder were spruce. Little spinneys of both species grew thickly along small gullies or in sheltered places along the lake shore, but single tamarack trees also grew almost to the tops of hills. Half these single trees were dead, but both at this and succeeding points, wherever trees grew in a group they were vigorous and flourishing. The spruce and tamarack grew to an equal height in sheltered places. In more open situations, the latter were often dwarfed and creeping. Dwarf birch was plentiful in moderately wet places, especially where there was a good depth of soil or peat. Alder bordered about a quarter of the lake shore. Labrador tea was plentiful in the marshy, wet areas both of the barrens and the woods. The hills rose to about 100 feet above the lake and

were often boulder covered. Only one real grass marsh was visited.

6. **Boundary Lake.** July 14-16. 550 feet above sea level. Between Malaher Lake and Boundary Lake the amount of wooded country decreased until at the latter place there was only about 4 per cent. Tamarack grew 15 or 20 feet high, but spruce was represented by creeping scrub only. The leaves on trees and shrubs were not noticeably less advanced than at Malaher Lake.

The hills surrounding Boundary Lake are low (about 40 feet above the lake), glacial moraines whose tops and sides were covered with fairly dry tussock tundra, Labrador tea and bake-apple. The lower ground was wet and marshy with considerable areas of grassland. Patches of alder grew two or three feet high, but it lined only a very small portion of the lake's edge.

7. **Tha-anne River.** July 16-20. 550 feet above sea level. As far as we could tell while flying at about 3,000 feet direct from Boundary Lake to our station on the Tha-anne River, the trees ended completely a short way north of the lake, but recommenced abruptly north of the Thlewiaza River where there was a short strip of country with about 30 per cent forest. This percentage decreased to 20 near our station on the Tha-anne River. Spruce and tamarack grew in about equal proportions, but the latter was mostly stunted. The base of one spruce measured 20 inches in circumference although only 15 feet high. Several tamarack measured a foot in diameter, and were about 20-25 feet high. The Tha-anne River was the only station where white spruce was noted. A little alder grew in damper areas near the lakes and on dryer ground there were patches of birch. In the vicinity of the river there was considerable dry, sandy ground. Elsewhere, grassy marshland and low, rather dry drift-covered hills occupied most of the barren areas. The whole country is very flat with a few isolated hills rising conspicuously 40 or 50 feet above their surroundings.

8. **Boulder Lake.** July 20-24. 900 feet above sea level. Small clumps (usually 4 to 100) of well-grown tamarack covered about 2 per cent of the country. Spruce grew only as scrub, and this, with alder and dwarf willow and birch (over 6 feet high), covered another 2 to 3 per cent.

A characteristic feature of the country surrounding Boulder Lake is the great number

of large granite boulders that cover the hills (60 feet) and lie in strings and patches in the valleys. The few exposures of solid rock examined were of the same massive granite as the boulders.

9. North end of South Henik Lake. July 24-26. 640 feet above sea level. Three miles north of the station there is a conspicuous 600-foot hill of white quartzite, and a bold, rounded ridge of the same rock runs south-west from this hill. To the north-east there is a group of rolling hills, the nearer ones of which are quartzite. The west shore (except at our camp at the north end) of South Henik Lake is low and flat, and almost or quite treeless,⁵ but a few miles from the shore there are small scattered areas of spruce. Near our camp there were patches of spruce scrub and dwarf willow 8 feet high, and a few well-shaped spruce trees grew in places sheltered by the hills. These together covered about 6 per cent of the country. There were also considerable areas of low (18-inch) dwarf birch. We saw neither alder nor tamarack. On the way to Camp Lake, just east of South Henik Lake, we flew over 15 to 20 miles of country covered by 10 to 25 per cent of woodland. This was the last we saw of spruce or tamarack.

10. Camp Lake. July 26-August 2. 340 feet above sea level. Spruce and tamarack were absent. Dwarf birch grew profusely to a height of about two and a half feet between the ridges, and covered 10 per cent of the total land. In the wetter places it was replaced by willow. Grass marshes accounted for another 20 per cent of the country, and the rest was taken up by the dry, rather bare tops and sides of glacial moraines.

Two or three miles to the east of Camp Lake some small, scattered hills of solid rock rise 20 to 40 feet above their surroundings. From a distance these appear almost mountainous in contrast to the smooth, low outline of the moraines. These moraines run in an east-west direction and control the shape of the numerous small lakes that lie between them. The bays of the larger lakes are similarly controlled and elongated in an east-west direction.

11. Carr Lake. August 2-6. 130 feet above sea level. The vegetation was similar to that at Camp Lake except that there was less grassy marshland.

⁵) This area was not visited and hence is excluded from the population estimates given under the species seen at South Henik Lake.

Our camp was half way along a narrow mile-long promontory formed by an esker of sand, gravel and boulders which continued over the land to the south for several miles. About 15 miles away at the north end of the lake there is a conspicuous hill probably rising 500 feet above the lake surface.

12. Alder Lake. August 6-10. 90 feet above sea level. The greater part of Alder Lake is shoal and rocky. On its east side there are low (60 feet), barren, rocky ridges amongst which are well-defined marine beaches. To the north and south the land is smoother and covered by glacial drift. In general, the vegetation is distinctly more arctic than at any of the previous stations. *Dryas octopetala* was seen for the first time, and *Casiopea tetragona* replaced the Labrador tea in most places. Where Labrador tea did grow, it was very small and dwarfed, but in sheltered places there were several acres of low, dwarf birch which gave cover to the Savannah sparrows and ptarmigan, and in some places amongst the ridges there were patches of dwarf willow 2 or 3 feet high. In one spot a small patch of alder grew luxuriantly, with stems to 2 inches thick. There was very little grassy marshland.

13. Victory Lake. August 10-15. 230 feet above sea level.

Victory Lake is formed by a broadening of the Ferguson River a few miles after it leaves Kaminuriak Lake. The water is deep and clear, but the shores of the lake are low and flat on both sides. Several of the small points, like the one on which we camped, have short boulder ridges about 12 feet high on their up-stream side, presumably caused by ice action at the spring break-up. A mile or two from the south-west shore of the lake, low, rolling hills commence. Ten miles to the west they rise 300 or 400 feet above the lake, and from the air their bare rock tops appeared mottled with large white patches.

Within a radius of 3 or 4 miles of our camp, the ground was chiefly moderately dry tundra of which about half was covered by low, dwarf birch. There was only a little grassy marshland.

14. Derby Lake. August 15-16. 200 feet above sea level.

15. Lake Ninety-Seven. August 16-17. 370 feet above sea level.

16. Twin Lake. August 17-21. 120 feet above sea level.

17. Smoke Lake. August 21-23. 150 feet above sea level.

Owing to good weather, the last five stations were completed too quickly for more than the most cursory observations on the country and fauna to be made. All these points were in the true barren country, and the general appearance of the flora was similar in kind and quantity to that at places several hundred miles farther north. There was very little dwarf willow or birch and the hilltops and slopes were either boulder-covered moraine, or, as at Smoke Lake, bare, solid rock. There were small lakes and marshland between the ridges, but no extensive areas of grass marshland such as are favoured by sandpipers.

Our camp at Derby Lake was at the south end near where the Wilson River flows out. There were several small beacons and other signs of an Eskimo camping ground nearby. The surrounding hills do not rise to more than 30 or 40 feet.

The north part of Lake Ninety-Seven is filled with shoals and small islands; the southern part is comparatively clear. Near the south-east end of the lake there is a prominent hill rising to about 150 feet above the surrounding country. The remainder of the hills which are composed of both drift and solid rock do not rise more than 30 feet above the lake.

Twin Lake is another shallow, island-filled lake. Solid rock is exposed on the tops of the higher hills (about 60 feet), but the lower ridges are principally composed of drift material. Our camp was on an esker⁹ similar to that at Carr Lake, but running about 10° east of north.

As Chesterfield Inlet is approached from Twin Lake, bare solid rock becomes more frequent, and on the north side of the inlet the hills are rather higher and distinctly more rugged. The highest rises about 250 feet above Smoke Lake. As might be expected in this type of country, Smoke Lake is deep and clear. From Smoke Lake we saw a column of smoke rising from the south side of the Connery River. We flew over to examine this smoke which appeared to be rising from amongst some boulders. From the air we could not discern the cause, but F/L Carr learned at Chesterfield post that peat fires

had previously been reported by the Eskimos. This had been an exceptionally dry season.

18. **Christopher Island.** August 23-24. Sea level.

19. **Baker Lake Post.** August 24-26. Sea level.

The hills on the north side of Chesterfield Inlet increase in height as Baker Lake is approached, and probably reach 600 feet near the exit from the lake. Westward from there along the north shore of the lake, their height decreases again and the country becomes less rugged. Near Baker Lake post, the maximum height of the hills is about 100 feet, with broad grass, lichen-, and heath-covered valleys. The country along the south side of Baker Lake is similar to that at Baker Lake post. There is one cliff, and some fairly rough 150-foot hills at the eastern end of Christopher Island, but the western coast is flatter country. Small patches of a large-leaved dwarf willow grew 3 or 4 feet high on Christopher Island, and there were larger patches amongst the hills on the mainland to the east.

Some of the beaches at the east end of Baker Lake are composed entirely of shells. One of these shell deposits on Christopher Island was at least 3 feet deep.

According to Father Choque, a missionary at Baker Lake post, there is an occasional tide of a few inches at that place. We noted a 6-inch rise at Christopher Island on August 23, the date of full moon. Lines of kelp clearly showed that the water occasionally reached higher levels either through tides or floods. According to some residents at Baker Lake post, the lake has been unusually low during recent years.

INTRODUCTORY REMARKS ON THE BIRDS

As mentioned above, the snow and the break-up of the lakes was one to two weeks behind normal. This may have had an effect on the bird life, although it was not apparent in the single season's work. There were reports at The Pas that white-fronted geese, *Anser albifrons*, were nesting in the neighbourhood, and through the courtesy of Mr G. W. Malaher I was able to make a trip with a Manitoba Game Warden, Mr. J. Reader, to Root and Rocky lakes, one of the areas where the geese had been seen. There were large numbers of many species of water birds on and about these lakes, but we saw no signs of the white-fronted geese, and it seems probable that although delayed at The Pas by the late break-up well beyond their usual time, they had finally moved north.

⁹ I can recall seeing only two well marked eskers north and east of the region between Sandhill and Malaher lakes, but farther west they are numerous. The sand, gravel and boulder eskers at Carr and Twin lakes are very different from the pure sand eskers at Sandhill Lake and further south. It seems reasonable to suppose that any sand eskers that there may have been in the lower country were destroyed by post-glacial marine erosion.

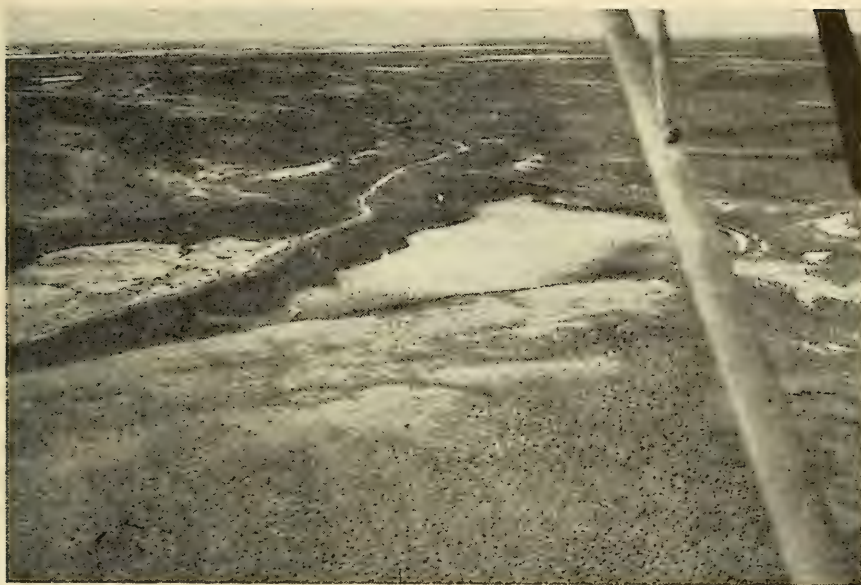


FIG. 2. June 24. At 2,000 feet. Looking north-east from Sandhill Lake. There is some rotten ice in the lake in the foreground and in the distance the lakes are all frozen. The light patches at left centre and extreme right are bare sand as is also the light streak in the centre of the esker.



FIG. 3. A portion of the barren ground shown in the foreground of the top photograph.

In the following annotated list of birds, the omission of any reference to a species at a particular station means that it was not observed there. Owing to the very limited time available for investigating the fauna at most of the stations, it is probable that a few of the less common but regular resident species were missed. When the numbers are large they are estimates (recorded daily) rather than actual counts. For species which were seen regularly and in sufficient numbers to warrant averaging, I have given the population per square mile of land (exclusive of lakes). This is derived from three estimates: (1) The number of birds seen at the station, (2) Distance walked, (3) Distance at which birds of that species could be seen. Since the time I spent in certain habitats was not always proportionate to the area covered by these habitats, a further adjustment has frequently been necessary. Taken as an absolute number, the error in the figures may approach 100 per cent or more if the numbers are small, but the relative error between similarly sized species or between the same species at different stations should be considerably less. On the semi-barrens some species are found only or mostly in small clumps of trees or scrub. I have therefore in some cases made an estimate of the population per square mile of bush-covered country as well as one for the whole land area. Included in the "bush" area are all patches of tamarack and spruce, and alder, willow or birch if they are over 6 feet. The latter may seem rather arbitrary, but at our stations at least, there was a sharp gap between rather thin dwarf willow and birch (chiefly birch) which covered wide areas on the barrens and were seldom over 3 feet high, and small patches in sheltered hollows of dense dwarf willow and alder usually higher than a man. This latter type of cover was often associated with tamarack and spruce and was not seen after we had left the last spruce at South Henik Lake. It was as popular a habitat for the American robin, grey-cheeked thrush and black-poll warbler as the spruce and tamarack, but slightly less favoured by the Harris' sparrow. None of these five species was seen more than casually in the lower dwarf willow and birch mentioned above. The proportion of tall willow and alder⁷ to spruce and tamarack⁷ was sufficiently large to be of importance only at Boulder and South Henik lakes.

⁷ Alder and tamarack were not seen at the latter place.

It will be seen from the map that we commenced work 180 miles southwest of the tree line about the beginning of the nesting season and that we reached typical inland barren ground country before the end of the nesting season. This provided an excellent opportunity to observe the variation in bird numbers through the transition from forest to barren grounds (see table 1). The country we passed through may be divided into four faunal zones as follows:

(1) Spruce forest. This zone was represented by Big Sand Lake and Neck Lake. In it, the number of individuals was small—about 70 to the square mile. As the time spent at these two stations was short, the scarcity of individuals naturally affected the number of species recorded which was only 17.

(2) Fairly thin spruce forest with a small percentage of barren ground. Sandhill Lake was the only station we had in this type of country. The number of species (28) was more than seen further north at any one place and the number of individuals (285) was considerably greater than further south. The absence of longspurs and ptarmigan and the presence of Canada jays, pine grosbeaks and spruce grouse separates it from zone 3.

(3) Barren ground with patches of spruce and tamarack. We had five stations in this zone. The average number of birds per square mile increased to 375, owing largely to Lapland longspurs which averaged 140 to the square mile. Thirty-one species were recorded. American robins, black-poll warblers, grey-cheeked thrushes and particularly Harris' sparrow were some of the birds which were fairly numerous to the extreme limit of trees but apparently did not get beyond them.

We had ten stations on the barren grounds, but only short stops were made at some of them, and after Alder Lake, August 10, I believe many of the birds had begun to migrate, probably towards the coast of Hudson Bay. The number of species (23) and individuals were fewer than in the transition from the wooded regions, and the small numbers of ducks and sandpipers which were seen in this inland region of the Precambrian Shield is worth noting in comparison with coastal regions. About half the total bird population was made up of Lapland longspurs.

Common Loon.

Gavia immer (Brünnich). — Fourteen common loons were recorded at Sandhill Lake, and 3 at Neck Lake. An additional 12 at the

TABLE 1.—BIRD POPULATION

| No. on Map | Name | Area bush | Date | Time observing | Estimated no. birds seen | Estimated no. birds p.sq.mi. | No. species seen |
|------------------------------|--------|------------|-----------------|----------------|--------------------------|------------------------------|------------------|
| 1. Eyrie Lake | 100% | June 14-16 | No observation | | | | |
| 2. Big Sand Lake | 100% | " 16-19 | 5 hrs. 100 | 100 | 13 | | |
| 3. Neck Lake | 100% | " 19-22 | 10 " 70 | 40 | 11 | | |
| 4. Sandhill Lake | 80% | " 22- | 43 " 800 | 270 | 28 | | |
| | | July 6 | | | | | |
| 5. Malaher Lake | 20% | " 6-14 | 14 " 530 | 320 | 21 | | |
| | | | (Half in bush) | | | | |
| 6. Boundary Lake | 4% | " 14-16 | 4 hrs. 190 | 450 | 15 | | |
| | | | (Third in bush) | | | | |
| 7. Tha-anne River | 20% | " 16-20 | 6½ hrs. 250 | 340 | 20 | | |
| | | | (Half in bush) | | | | |
| 8. Boulder Lake | 5% | " 20-24 | 9½ hrs. 430 | 300 | 19 | | |
| | | | (2/5 in bush) | | | | |
| 9. South Henik Lake | 6% | " 24-26 | 6 hrs. 220 | 480 | 16 | | |
| | | | (1/12 in bush) | | | | |
| 10. Camp Lake | Barren | " 26- | 14 hrs. 370 | 420 | 17 | | |
| | | Aug. 2 | | (30% juvenile) | | | |
| 11. Carr Lake | " | " 2- 6 | 10 hrs. 180 | 180 | 17 | | |
| | | | | (50% juvenile) | | | |
| 12. Alder Lake | " | " 6-10 | 7 " 130 | 210 | 8 | | |
| | | | | (70% juvenile) | | | |
| 13. Victory Lake | " | " 10-15 | 7 " 140 | 160 | 11. | | |
| | | | | (65% juvenile) | | | |
| 14. Derby Lake | " | " 15-16 | No observation | | | | |
| 15. Lake Ninety-seven | " | " 16-17 | 2 hrs. 40 | 150 | 8 | | |
| | | | | (65% juvenile) | | | |
| 16. Twin Lake | " | " 17-21 | 4 hrs. 50 | 110 | 8 | | |
| | | | | (70% juvenile) | | | |
| 17. Smoke Lake | " | " 21-23 | 2 hrs. 30 | 150 | 1 | | |
| | | | | (75% juvenile) | | | |
| 18. Christopher Island | " | " 23-24 | No observation | | | | |
| 19. Baker Lake Post | " | " 24-26 | 3 hrs. 60 | 160 | 3 | | |
| | | | | (70% juvenile) | | | |

former and 3 at the latter place were not identified specifically. Nine loons seen at Malaher Lake and 2 at Boundary Lake were also not identified. One common loon was heard at Carr Lake, and 1 at Twin Lake. A near view was obtained of 3 common loons at Lake Ninety-Seven. The measurements of an unsexed specimen collected for me by F/L Carr a few miles east of Brochet Post on Reinder Lake were: flattened wing, 342 mm., culmen 75 mm.

Yellow-billed Loon.

Gavia adamsii (Gray). — I kept a careful watch for this loon, but saw none during the season. Porsild (M.S.), however, says, "Perhaps the most common of the loons of the interior. During August and September 1930 observed daily on the Kazan River as well as on the lakes through which the Kazan flows". Perhaps its normal eastern

limit in these latitudes is somewhere between our stations and the Kazan River.

Pacific Loon.

Gavia arctica pacifica (Lawrence). — One of a pair of Pacific loons was collected at Camp Lake, and two other pairs were seen there. One of these latter was accompanied by two downy young. Another pair with one young was seen at Twin Lake. Eight adults (one group of 2, and one of 6) were seen feeding on Carr Lake. Some of the unidentified loons recorded under *G. immer* may belong to this species.

Red-throated Loon.

Gavia stellata (Pontoppidan). — A pair was collected and two other pairs seen at Twin Lake. It is not likely that any of the unidentified loons recorded under *G. immer* belonged to this species.

Canada Goose.

Branta canadensis (Linnaeus). — Ten geese, probably of this species, were seen in the distance at Big Sand Lake. At Neck Lake 2, and at Sandhill Lake, 18, Canada geese were seen. All appeared large, and were probably *B.c. interior*. A pair of Canada geese with about 5 young were seen at Camp Lake, and another pair with 2 young at Carr Lake. The female of the latter pair was collected. Its measurements, flattened wing, 380 mm., culmen 38 mm., depth of bill, 20 mm., depth into culmen, 1.90 mm., fall within the size range given by Taverner (1931) for *B.c. leucopareia*.

Porsild found Canada geese very common on the lower Kazan River and on the south shore of Baker Lake in the latter part of August. He saw a pair at latitude 63° 11' on the Kazan, and on August 2, he collected 4 juvenile specimens. On August 29, he saw a large flock of upwards of 100 birds.

The average of Taverner's measurements (National Museum of Canada records) of Porsild's four specimens are: mid toe and claw, 68.6 mm.; tarsus, 77.2 mm.; toe into tarsus, 1.11 mm.; culmen, 35.2 mm.; depth of bill, 19.4 mm.; depth into culmen, 1.91 mm. Although some of these measurements approach those given by Taverner (1931) for *B.c. hutchinsii* the tarsus is considerably larger, and when it is remembered that they are rather young juveniles, there seems little doubt that they are referable to *B.c. leucopareia*.

American Pintail.

Anas acuta tzitzihua Vieillot. — A single female was seen and collected at Malaher Lake. It behaved as if it had a nest nearby, although I was unable to locate it. Four pin-tails were seen at Boundary Lake.

Baldpate.

Mareca americana (Gmelin). — Four were identified and 1 collected at Big Sand Lake. Two more were seen at Neck Lake.

Shoveller.

Spatula clypeata (Linnaeus). — Four were identified at Big Sand Lake.

Old-Squaw.

Clangula hyemalis (Linnaeus). — One old squaw was seen at Malaher Lake, 5 at Boundary Lake and 1 at Carr Lake. Six adults, one of which had a family of 7 downies, were seen at Camp Lake. At Victory Lake, one adult with 15 young were seen. The adult and two young were collected.

Surf Scoter.

Melanitta perspicillata (Linnaeus). — Two surf scoters were collected from a feeding flock of 5 near Sandhill Lake. An additional 9 seen flying over Sandhill Lake were thought to be of this species. Two flocks of scoters (about 10 each) at Neck Lake were not identified specifically.

American Scoter.

Oidemia nigra americana Swainson. — Two were collected from a feeding group of 3 near Boulder Lake. Another 4 unidentified ducks were probably of this species.

Red-breasted Merganser.

Mergus serrator Linnaeus. (Table 2.)—Since the 5 birds collected were all *M. serrator*, and other evidence of the occurrence of *M. merganser* is lacking, it has been assumed that all the mergansers seen were *M. serrator*. If this be correct, *M. serrator* appears to be fairly evenly distributed over the area investigated between the extreme southern border of the barren areas (Sandhill Lake) and the extreme northern limit of trees. The average population of mergansers was 1 to 2 to a square mile. No evidence of nesting was observed. Our failure to see any mergansers north of the north end of South Henik Lake may have been partly due to all males and non-breeding females having gone out to the coast.

TABLE 2.—POPULATIONS OF RED-BREASTED MERGANSER

| | Area of bush | No. seen | No. Collected |
|------------------------|--------------|----------|---------------|
| Sandhill Lake | 80% | 13 | 4 |
| Malaher Lake | 20% | 4 | |
| Boundary Lake | 4% | 4 | |
| Tha-anne River | 20% | 6 | 1 |
| Boulder Lake | 5% | 1 | |
| South Henik Lake | 6% | 1 | |



FIG. 4. Sandhill Lake. Dwarf birch spreading over dry ground in which the spruce have died. The bare tamarack can be seen among the spruce at the right of the photograph.



FIG. 5. White birch on the sand hills at Sandhill Lake.

American Rough-legged Hawk.

Buteo lagopus s. johannis (Gmelin).—A pair of light phased individuals had a nest on a cliff at Christopher Island. The eldest of the 4 young in this nest was about ready to leave it and jumped out when disturbed (August 23). This was the only true cliff visited during the summer.

Bald Eagle.

Haliaeetus leucocephalus (Linnaeus). — A pair of bald eagles had a nest at the top of a pine tree on a ridge 20 feet above Eyrie Lake.

Gyr Falcon.

Falco rusticolus obsoletus Gmelin.—Porsild collected a gyrfalcon (probably juvenile) at Chesterfield on September 10, 1930.

Duck Hawk.

Falco peregrinus anatum Bonaparte. — Only one pair was seen. At Carr Lake, they had a nest on top of a 2½ foot high rock on a boulder-strewn plain 5 miles from the nearest rocky hills. The single downy young was about a week old. The downy and the female parent were collected. The downy had been feeding on small birds; the parent on lemming. In flight the female appeared dark-breasted while the male appeared quite white.

Spruce Grouse .

Canachites canadensis (Linnaeus). — This species was seen only at Sandhill Lake. Three of the five (all male) individuals seen were collected. They frequented the thickest clumps of spruce which were usually situated near the lake edge. The population in the vicinity of the lake was about 2 per square mile.

The three specimens were inseparable from specimens of *C. c. osgoodi* from the Yukon Territory. Both my specimens and

the Yukon birds were greyer and less brown on the wing and back than specimens of *C. c. canadensis* from James Bay and further east. A series of Wood Buffalo Park males were also tinged with brown on the wing. The wing (chord) measurements of the 3 Sandhill Lake birds were 176, 175 and 172 mm.

Willow Ptarmigan.

Lagopus lagopus lagopus (Linnaeus). (Table 3).—All the willow ptarmigan seen south of and including Alder Lake were males. Between Malaher Lake and Victory Lake they were fairly evenly distributed with about one male to a square mile, or one pair to a square mile if it be assumed that there was an equivalent number of unobserved sitting females. The 10 birds seen at Alder Lake were a pair and their 8 young. The latter on August 8 were still less than half the size of the parents, but able to fly well. In country with scattered spruce and tamarack the willow ptarmigan were usually found in clumps of these trees or else in thick clumps of willow or birch scrub. Further north they were found amongst dwarf birch.

"In August 1930, the species was exceedingly common on the Kazan River and in the Yathkyed Lake district. Two broods of young appeared to be the rule, as in August adult birds were generally accompanied by two flocks of young of different size and age." (Porsild MS).

From the above and from conversation with Porsild, it is clear that ptarmigan were much more numerous about the Kazan and Yathkyed Lake region in 1930 than they were in our area in 1945. The difference is probably due to a cycle rather than the region.

All my 9 specimens had black-shafted primaries, and, following Peters (1934 p. 30), are referred to *L. l. lagopus*.

TABLE 3.—POPULATIONS OF WILLOW PTARMIGAN

| | Area of bush | No. seen | No. collected |
|------------------------|--------------|----------|---------------|
| Malaher Lake | 20% | 5 | 2 |
| Boundary Lake | 4% | 2 | 1 |
| Tha-anne River | 20% | 2 | 2 |
| Boulder Lake | 5% | 2 | |
| South Henik Lake | 6% | 1 | |
| Camp Lake | Barren | 1 | 1 |
| Carr Lake | " | 2 | |
| Alder Lake | " | 10* | 3 |
| Victory Lake | " | 2 | |

*Including young.

Rock Ptarmigan.

Lagopus mutus rupestris (Gmelin). — At Alder Lake a female and about 8 young were seen in a clump of dwarf birch within a hundred yards of the willow ptarmigan family. The young of both were in about the same stage of development. The adult female was scarcely able to fly owing to the moulting of several of its primaries. The parent and two of the young were collected. Four rock ptarmigan were seen amongst the dwarf birch at Victory Lake, and a male and two females were collected. Porsild (MS) saw no rock ptarmigan west of Hudson Bay in August and September.

Little Brown Crane.

Grus canadensis canadensis (Linnaeus).—An adult pair later joined by 2 immature was seen at Carr Lake, and one other adult pair at Christopher Island. On Sept. 28-29, Porsild (MS) saw a pair on the south shore of Baker Lake.

Semipalmated Plover.

Charadrius hiaticula semipalmatus Bonaparte. — (Table 4.)—One or two semipalmated plovers could usually be seen running busily about on any large sandy beach in the vicinity of Sandhill Lake, but they were seen nowhere at that place, and they gave no sign of having nests. They were undoubtedly nesting at Malaher and Boulder lakes and at the Tha-anne River. They favour dry, sandy or gravelly ground with short vegetation close to large lakes or the sea.

The large number of semipalmated plovers near our station at the Tha-anne River was probably quite local and due to the numerous sand beaches and dry sand ridges along the river. The edge of Boundary Lake was too wet and lacking in sandy beaches. Carr Lake was very suitable, but none were seen there or elsewhere on the barren ground. It is just possible that they migrate to the coast directly the young can fly and had begun to move before we reached Carr Lake on August 2. No juveniles were seen.

TABLE 4.—POPULATIONS OF SEMIPALMATED PLOVER

| | Area of bush | No. seen | No. Collected | Estimated no. per sq. mi. of land. |
|------------------------|--------------|----------|---------------|------------------------------------|
| Sandhill Lake | 80% | 10 | 3 | 1.5 |
| Malaher Lake | 20% | 14 | | 10. |
| Tha-anne River | 20% | 15 | | 20. |
| Boulder Lake | 5% | 8 | | 8. |
| South Henik Lake | 6% | 5 | | 6. |

Hudsonian Curlew.

Numenius phaeopus hudsonicus Latham — (Table 5). — This species was seen not on the grass marshes, but on fairly dry tundra and low, often boulder-covered hillsides. All birds were in pairs, and probably nesting. A nest was found at Boundary Lake with two

downy young and a piped egg. These were collected together with their parents. At Boundary Lake, 2 curlews attempted and occasionally succeeded in settling on trees for short periods. They were very agitated owing to my proximity to their nest.

TABLE 5.—POPULATIONS OF HUDSONIAN CURLEW

| | Area of bush | No. seen | No. Collected | Estimated no. p. sq. mi. land. |
|----------------------|--------------|----------------|----------------|--------------------------------|
| Malaher Lake | 20% | 6 | 2 | 1 |
| Boundary Lake | 4% | 8 ^s | 2 ^s | 4 ^s |
| Tha-anne River | 20% | 6 | | 2 |

Spotted Sandpiper.

Actitis macularia (Linnaeus).—(Table 6.)—Spotted sandpipers are seldom to be seen away from a lake shore, and the long, alder-

Lake, and 1 was collected. Forty-six were seen at Sandhill Lake and 6 were collected. They were mostly in two's, but not necessa-

^s) Excluding downy young.

TABLE 6.—POPULATIONS OF SPOTTED SANDPIPER

| | Area of bush | No. seen | No. Collected | Estimated no. p. sq. mi. land. |
|---------------------|--------------|----------|---------------|--------------------------------|
| Big Sand Lake | 100% | 20 | | 8 |
| Neck Lake | 100% | 1 | 1 | 1 |
| Sandhill Lake | 80% | 18 | 1 | 4 |

covered point on which we camped at Big Sand Lake was a particularly favourable place for them. The estimate of the square mile population takes these facts into consideration, and is for the surrounding country as a whole. It is here necessarily a very rough estimate. A few spotted sandpipers presumably breed at Sandhill Lake, but none that I saw gave evidence of having nests. They were usually seen on the sandy beaches.

Lesser Yellow-legs.

Totanus flavipes (Gmelin).—Two lesser yellow-legs flew over our camp at Big Sand rily paired, as in one case both proved to be males. Groups of 3 and one group of 6 were also seen. At Sandhill Lake they were usually found near a small pool in the small barren areas or where the trees were thin. They frequently balanced themselves precariously on tree tops. I saw no definite evidence of nesting at Sandhill Lake. At Malaher Lake, I saw 2 pairs which appeared

to be nesting close together in a very wet, partly alder-covered marsh.

White-rumped Sandpiper.

Erolia fuscicollis (Vieillot). — Eight were seen at Big Sand Lake, presumably in migration. One was collected.

Least Sandpiper.

Erolia minutilla (Vieillot). — (Table 7.) — A few small groups (3-5) were seen at Malaher, Boundary and Boulder lakes, but no larger flocks. A large proportion were counted at Boundary and Boulder lakes while performing their flight song. A nest with 4 eggs which would hatch in about 4 days was found at Malaher Lake on July 12, and least sandpipers were undoubtedly nesting at Boundary and Boulder lakes and the Thanne River. It probably nests at all places where it was recorded, though definite evidence was not always obtained. At Sandhill Lake least sandpipers were seen only in the vicinity of the sand beaches which bordered big lakes.

TABLE 7.—POPULATIONS OF LEAST SANDPIPER

| | Area of bush | No. seen | No. Collected | Estimated no. p. sq. mi. land. |
|------------------------|--------------|----------|---------------|--------------------------------|
| Big Sand Lake | 100% | 8 | 1 | 4 |
| Sandhill Lake | 80% | 34 | 4 | 8 |
| Malaher Lake | 20% | 21 | 1 | 15 |
| Boundary Lake | 4% | 30 | | 80 |
| Tha-anne River | 20% | 25 | | 40 |
| Boulder Lake | 5% | 53 | | 70 |
| South Henik Lake | 6% | 10 | | 13 |
| Camp Lake | Barren | 5 | 1 | 4 |
| Carr Lake | " | 5 | | 4 |

Red-backed Sandpiper.

Erolia alpina pacifica (Coues) — Nine single birds were seen in the grassy marshes at Camp Lake. They gave no indication of having nests, and the four specimens collected were all males. A single bird seen at Carr Lake was thought to be of this species.

Stilt Sandpiper.

Micropalama himantopus (Bonaparte) — Fifteen adult stilt sandpipers were seen at Boundary Lake. About half of these were alone and might have been nesting. The remainder were in 2 small flocks. A male and a female with the 4 day-old young of the latter were collected on July 13. A single male was seen and collected at Boulder Lake.

Semipalmated Sandpiper.

Ereunetes pusillus (Linnaeus). — Every opportunity was taken to examine small sandpipers closely and to distinguish this species from *Erolia minutilla* but only six adults were identified. One was seen and collected at the Tha-anne River; one with 4 downy young, probably 3 or 4 days old, was seen at Camp Lake, and 4 were seen at Carr Lake. The song of the semipalmated sand-

pipers is similar to, but distinctly harsher than that of the least sandpiper.

Northern Phalarope.

Lobipes lobatus (Linnaeus). — (Table 8). — These were mostly seen in flocks of 3 to 6, but I think a few pairs were nesting at our station on the Tha-anne River, near which Porsild (MS) found them very common on July 12, 1930. Porsild also saw northern phalaropes on Yathkyed Lake in August and near Chesterfield about September 15.

TABLE 8.—POPULATIONS OF NORTHERN PHALAROPE

| | Area bush | No. seen | Estimated no. p. sq. mi. land. |
|----------------------|-----------|----------|--------------------------------------|
| Boundary Lake | 4% | 20 | 30 |
| Tha-anne River | 20% | 20 | 20 |
| Boulder Lake | 5% | 10 | 8 |
| Camp Lake | Barren | 40 | 10 |
| Carr Lake | " | 10 | 4 |

Parasitic Jaeger.

Stercorarius parasiticus (Linnaeus). — (Table 9). — One pair at Victory Lake undoubtedly had either young or a nest. The stomachs of

two males collected at Victory Lake contained lemmings. All the parasitic jaegers seen were light-phased adult birds.

TABLE 9.—POPULATIONS OF PARASITIC JAEGER

| | Area bush | No. seen | No. Collected | Estimated no. p. sq. mi. land. |
|-------------------------|-----------|----------|------------------|--------------------------------------|
| Tha-anne River | 20% | 5 | 1 | 1.2 |
| Camp Lake | Barren | 7 | 1 | 0.5 |
| Victory Lake | " | 12 | 2 | 1.7 |
| Lake Ninety-seven | " | 1 | | 0.5 |
| Twin Lake | " | 1 | | 0.2 |

Long-tailed Jaeger.

Stercorarius longicaudus Vieillot. — (Table 10) — The two long-tailed jaegers seen at Tha-anne River were a nesting pair. The stomachs of the two males collected at Victory Lake contained the remains of lem-

mings. Lemmings were very plentiful at Victory Lake, and this may have been the reason for the concentration of jaegers there. One of the birds seen at Baker Lake was a juvenile; the remainder were adult.

TABLE 10.—POPULATIONS OF LONG-TAILED JAEGER

| | Area bush | No. seen | No. Collected | Estimated no. p. sq. mi. land. |
|-----------------------|-----------|----------|------------------|--------------------------------------|
| Tha-anne River | 20% | 2 | | 0.5 |
| Boulder Lake | 5% | 1 | | 0.2 |
| Camp Lake | Barren | 5 | | 0.3 |
| Carr Lake | " | 2 | | 0.2 |
| Victory Lake | " | 20 | 2 | 3.0 |
| Baker Lake Post | " | 2 | | 0.7 |

Herring Gull.

Larus argentatus smithsonianus (Coues). — (Table 11). — From the above it can be seen that the herring gull is widely and evenly distributed throughout the region with about one pair to a square mile. Herring gulls are not recorded in my notes for Smoke Lake, Christopher Island or Baker Lake Post, but this may have been an oversight. South of Chesterfield Inlet, there are very few cliffs likely to hold colonies, and it may be presumed that these gulls were nesting

on rocks and small islands in lakes. No nests were found, however. Porsild (MS) records that this species was common, and while flying over the country he observed that each fair-sized lake was inhabited by one pair of gulls. He saw only a few nesting colonies. The largest was on a small rock island near the Kazan Falls where there were upwards of 50 individuals.

Every herring gull I saw during the summer was in full adult plumage. The 11 specimens were typical *L.a. smithsonianus*.

TABLE 11.—POPULATIONS OF HERRING GULL

| | Area bush | No. seen | No. Collected | Estimated no. p. sq. mi. land. |
|-------------------------|-----------|----------|---------------|--------------------------------|
| Big Sand Lake | 100% | 12 | 1 | 2. |
| Neck Lake | 100% | 12 | | 1.2 |
| Sandhill Lake | 80% | 51 | 3 | 2. |
| Malahar Lake | 20% | 11 | 1 | 1.5 |
| Boundary Lake | 4% | 5 | | 1.5 |
| Tha-anne River | 20% | 13 | 1 | 2.5 |
| Boulder Lake | 5% | 18 | | 2.5 |
| South Henik Lake | 6% | 10 | 2 | 1.5 |
| Camp Lake | Barren | 30 | | 2. |
| Carr Lake | " | 21 | 1 | 2. |
| Alder Lake | " | 3 | | 0.5 |
| Victory Lake | " | 12 | 2 | 1.5 |
| Lake Ninety-seven | " | 6 | | 2. |
| Twin Lake | " | 6 | | 1.5 |

Common Tern.

Sterno hirundo hirundo Linnaeus.—Six terns seen at Big Sand Lake were thought to be of this species, but none was collected. Twelve terns seen at Neck Lake were too distant for identification. No common terns were identified at Sandhill Lake or any of the stations north of there.

Arctic Tern.

Sterna paradisaea Pontoppidan.—(Table 12). —The comparatively large numbers at Tha-anne River may have been due either to the good fishing in the river or more probably the numerous sand bars which would form good nesting sites. No nests were found during the summer nor did any of the birds behave as if they had nests in the neighbourhood.

TABLE 12.—POPULATIONS OF ARCTIC TERN

| | Area bush | No. seen | No. Collected | Estimated no. p. sq. mi. land. |
|------------------------|-----------|----------|---------------|--------------------------------|
| Sandhill Lake | 80% | 101 | 4 | 5. |
| Malahar Lake | 20% | 16 | | 4. |
| Tha-anne River | 20% | 17 | | 8. |
| Boulder Lake | 4% | 5 | | 2. |
| South Henik Lake | 6% | 1 | | 0.3 |

Yellow-shafted Flicker.

Colaptes auratus (Linnaeus). — Two yellow-shafted flickers were seen in an hour's walk

amongst the spruce forest at Big Sand Lake. Many of the standing dead trees had been drilled. Presumably a more extended search



FIG. 6. Nest of Hudsonian Curlew with two downies and a pipped egg at Boundary Lake on July 15.



FIG. 7. Scattered tamaracks growing amongst scrub at Boulder Lake.

would have revealed the presence of this species at Neck Lake. No drilled trees were seen at Sandhill Lake.

American Three-toed Woodpecker.

Picoïdes tridactylus bacatus Bangs. — A single male specimen was seen and collected at Sandhill Lake. It closely resembled other Manitoba specimens in the National Museum. These have rather more white on the back than Ontario birds, but much less than specimens of *P.t. fasciatus* from Wood Buffalo Park and the Yukon Territory.

Hoyt Horned Lark.

Eremophila alpestris hoyti (Bishop).—(Table 13).—Horned larks favour dry, gravelly situations, particularly if sheltered by surrounding hills or ridges. These conditions were best met near the hills at South Henik Lake. The high lark population recorded there probably continued near the ridge which runs south-west and into the hills to the north-east toward Carr Lake where conditions were also

quite suitable. On the flat sand bordering most of the west side of South Henik Lake, they would probably be very scarce. There is also very suitable ground for larks among the ridges at Alder Lake, and had the population estimate been confined to these ridges instead of including the flatter and more open country, it would have been doubled. The country about Boundary and Camp lakes is unsuitable for larks.

The first young larks were seen flying at Carr Lake on August 3. They were mostly still accompanied and being fed by their mothers, and I think all were local birds. At places north of this, local birds may have been mixed with migrants, but there were no flocks. At Carr Lake, juveniles accounted for about half the total population given above; at later places, they accounted for almost two-thirds. All the specimens collected are referable to the above race, and other birds seen in the field appeared equally light faced.

TABLE 13.—POPULATIONS OF HOYT HORNED LARK

| | Area bush | No. seen | No. Collected | Estimated no p. sq. mi. land. |
|-------------------------|-------------------------|----------|---------------|-------------------------------|
| Malaher Lake | 20% | 17 | 5 | 15 |
| Boulder Lake | 5% | 4 | 1 | 6 |
| South Henik Lake | 6% | 15 | | 20 |
| Camp Lake | Barren | 2 | | 1. |
| Carr Lake | " (Including juveniles) | 20 | 3 | 16 |
| Alder Lake | " | 25 | 3 | 30 |
| Victory Lake | " | 5 | | 5 |
| Lake Ninety-seven | " | 2 | | 8 |
| Twin Lake | " | 2 | | 4 |
| Baker Lake Post | " | 8 | 2 | 15 |

Canada Jay.

Perisoreus canadensis canadensis (Linnaeus). —Three Canada jays visited our camp at Eyrie Lake. At Sandhill Lake, 15 Canada jays were seen, of which 4 adults and 2 juveniles were collected. The 15 recorded were made up of two groups of 4 each and one of 3 (families, I think), and 4 single adult birds. I estimated the population per square mile of land at Sandhill Lake as 3. The two juvenile specimens closely resembled juvenile *P.c. canadensis* from Nova Scotia, and are distinctly darker than juvenile *P.c. albescens* from the Wood Buffalo Park. The plumage of the adults is too worn for sub-specific identification.

Northern Raven.

Corvus corax principalis Ridgway. — Three ravens were seen at Sandhill Lake, and 2 at Boulder Lake. One of the latter was collected. It has not been identified subspecifically, but presumably belongs to the northern race *C.c. principalis*.

Eastern Robin.

Turdus migratorius migratorius Linnaeus. (Table 14). — At Sandhill Lake, the robins were usually seen in low scrub, or at the edge of the main woods. A low, rocky ridge where the spruce grew sparsely with some birch scrub was a particularly favourite habitat. The comparatively dense robin population in the scrub at South Henik Lake was

due to the hilly and rocky nature of the country. A few miles away from the hills it would probably have been much reduced. In addition to the numbers given below which were adults only, 4 juveniles able to

fly were seen at the Tha-anne River, 1 at Boulder Lake, and 7 at South Henik Lake. The specimens are referable to *T.m. migratorius*.

TABLE 14.—POPULATIONS OF EASTERN ROBIN

| | Area bush | No. seen | No. Collected | Estimated no. p. sq. mi. land | Estimated no. p. sq. mile bush |
|------------------------|-----------|----------|---------------|-------------------------------|--------------------------------|
| Neck Lake | 100% | 3 | | 2.5 | 2.5 |
| Sandhill Lake | 80% | 20 | 5 | 4. | 4. |
| Malaher Lake | 20% | 7 | 4 | 1. | 8. |
| Tha-anne River | 20% | 6 | 2 | 3. | 15. |
| Boulder Lake | 5% | 3 | | .3 | 6. |
| South Henik Lake | 6% | 8 | | 10. | 100. |

Grey-cheeked Thrush.

Hylocichla minima minima (Lafresnaye). — (Table 15).—At Sandhill Lake, grey-cheeked thrushes were usually seen in the dryer forest, frequently perched on the top of a tall spruce tree; but at Boulder and South Henik lakes, they frequented the tall dwarf willow scrub. All the birds seen were adults.

At Boulder Lake several were noticed carrying grubs, and so presumably had young in nests. The mean flattened wing measurements of the rather worn specimens were: for 6 males, 106.0 (101-109) mm.; and for 3 females, 97.7 (95-102) mm.; they are therefore referable to the larger northern race. (Wallace 1939).

TABLE 15.—POPULATIONS OF GREY-CHEEKED THRUSH

| | Area bush | No. seen | No. Collected | Estimated no. p. sq. mi. land | Estimated no. p. sq. mile bush |
|------------------------|-----------|----------|---------------|-------------------------------|--------------------------------|
| Sandhill Lake | 80% | 25 | 5 | 12 | 14 |
| Malaher Lake | 20% | 16 | 3 | 10 | 50 |
| Tha-anne River | 20% | 3 | | 3 | 18 |
| Boulder Lake | 5% | 31 | 1 | 6 | 130 |
| South Henik Lake | 6% | 10 | | 30 | 300 |

American Pipit.

Anthus spinoletta rubescens (Tunstall). — (Table 16). — The two pipits seen at Sandhill Lake were probably casual stragglers. On the barren grounds, this species was found wherever there were rocky ridges. On the bare, solid rock tops of the hills at Henik Lake, it was numerous being the only species of bird seen. It was also very plentiful on the few small, isolated, rocky ridges at Camp Lake — in fact, 80 per cent of the pipits counted at Camp Lake were seen in a half hour's visit to these ridges. The first young pipits were seen at Carr Lake. From then on, they formed about two-thirds of the pipit

population given above. By the time we arrived at Victory Lake, the pipits, like most of the other small birds, were commencing to migrate.

Northern Yellow Warbler.

Dendroica petechia amnicola Batchelder. — Five yellow warblers were seen amongst the alder at Big Sand Lake. One was collected. It was a typically dark-backed northern bird.

Myrtle Warbler.

Dendroica coronata (Linnaeus).—One myrtle warbler was seen and collected at Neck Lake. At Sandhill Lake, 7 were seen of which 2 were collected. The estimated population at the latter place was 5 per square mile.

TABLE 16.—POPULATIONS OF AMERICAN PIPIT

| | Area bush | No. seen | No. Collected | Estimated no. per sq. mi. land |
|-------------------------|-----------|----------|-----------------------|--------------------------------|
| Sandhill Lake | 80% | 2 | 1 | 0.5 |
| Malaher Lake | 20% | 5 | | 7. |
| South Henik Lake | 6% | 35 | | 60. |
| Camp Lake | Barren | 28 | | 20. |
| Carr Lake | " | 32 | (Including juveniles) | 32. |
| Alder Lake | " | 18 | 1 | 26. |
| Victory Lake | " | 10 | | 14. |
| Lake Ninety-seven | " | 8 | | 40. |
| Twin Lake | " | 6 | | 15. |

Black-poll Warbler.

Dendroica striata (Forster).—(Table 17). — This species is not readily seen while the observer is walking through the thick undergrowth it frequents, and during the height of the mosquito season, an observer does not

stand still long in that habitat. This may account for the apparent absence of black-poll warblers at Malaher Lake. Longer observation in the willow and spruce thickets would probably have revealed their presence also at South Henik Lake.

TABLE 17.—POPULATIONS OF BLACK-POLL WARBLER

| | Area bush | No. seen | No. Collected | Estimated no. per sq. mi. land | Estimated no. p. sq. mi. bush. |
|----------------------|-----------|----------|---------------|--------------------------------|--------------------------------|
| Big Sand Lake | 100% | 3 | | 18 | 18 |
| Neck Lake | 100% | 8 | 3 | 24 | 24 |
| Sandhill Lake | 80% | 151 | 8 | 105 | 105 |
| Tha-anne River | 20% | 5 | 1 | 9 | 45 |
| Boulder Lake | 5% | 16 | | 6 | 120 |

Rusty Blackbird.

Euphagus carolinus (Müller). — At Sandhill Lake, 8 (one group of 3, the remainder single birds), and at Malaher Lake, 4 single birds were seen. A male and a female were collected at Sandhill Lake, and a male at Malaher Lake. No rusty blackbirds were seen more than a hundred yards from one of the larger lakes. They appeared to favour the border of alder often found around these lakes. The first rusty blackbird was not seen until July 1, and I do not think there were any at Sandhill Lake until that date. They were probably not nesting.

Canadian Pine Grosbeak.

Pinicola enucleator leucura (Müller). — Four were seen and collected at Sandhill Lake. Two males were single birds; the other two were together, being a male and a female, both juvenile. The estimated population for

a square mile is under 1. The specimens compared well with the birds from the vicinity of Ottawa. The measurements of the two adults males were: wing (chord) 123 and 122 mm.; exposed culmen: 14.5 and 15.0 mm.

Hoary Redpoll, Common Redpoll.

Acanthis hornemanni exilipes (Coues). — *A. flammea flammea* (Linnaeus).—(Table 18).— At Sandhill Lake, redpolls were seen close to the lake shore only. At the next four stations, almost all those seen were in patches of tamarack and spruce and occasionally in scrub. At South Henik Lake, they were more widely distributed, and frequently seen in short birch scrub. The first juvenile redpoll was seen at Malaher Lake, and about four (included in the table) were seen at the Tha-anne River, but I think the remainder were adult birds. Porsild (MS) found redpolls common on July 11-12 on the upper

Tha-anne River, but he saw few about Yathkyed Lake and the lower Kazan River in August and September.

No hoary redpolls were recognized in the field, but a comparison of the material collected shows that two males from Boulder Lake are definitely *Acanthis hornemanni exilipes*, while the other specimen, a female,

is probably the same. One male from the Tha-anne River is *A.h. exilipes*; the other, *A.f. flammea*. The remainder are *A.f. flammea* except for one male and one female from Malaher Lake which might possibly be *A.h. exilipes*. I believe hoary redpolls if present at all were scarce at our stations south of Boulder Lake.

TABLE 18.—POPULATIONS OF HOARY REDPOLL, COMMON REDPOLL

| | Area bush | No. seen | No. Collected | Estimated no. p. sq. mi. land | Estimated no. p. sq. mi. bush |
|------------------------|-----------|----------|---------------|-------------------------------|-------------------------------|
| Big Sand Lake | 100% | 1 | 1 | 5 | 5 |
| Sandhill Lake | 80% | 4 | 2 | 3 | 3 |
| Malaher Lake | 20% | 14 | 5 | 15 | 50 |
| Boundary Lake | 4% | 8 | 2 | 12 | 150 |
| Tha-anne River | 20% | 21 | 3 | 30 | 130 |
| Boulder Lake | 5% | 18 | 3 | 15 | 110 |
| South Henik Lake | 6% | 20 | | 80 | ? |
| Camp Lake | Barren | 1 | | 2 | |
| Carr Lake | " | 1 | | 3 | |
| Alder Lake | " | 1 | | 3 | |

Savannah Sparrow.

Passerculus sandwichensis oblitus Peters & Griscom.—(Table 19). — At Sandhill Lake, Savannah sparrows were seen only in scrub, or close to the edge of the main bush. At the stations north of Sandhill Lake, but still south of the timber line, they were most often seen in or near the small clumps of trees. An exception was South Henik Lake, where they were seen chiefly in the low, dwarf birch in which they also lived north of the timber line. Victory Lake, with its very large areas of dwarf birch, should be

an excellent nesting ground for Savannah sparrows, but by the time we arrived (August 11), they were commencing to form into small, migratory flocks, and scarcely any were seen except near the lake shore. Nesting may have been disturbed by the very large numbers of caribou which had browsed on the dwarf birch. Young Savannah sparrows were first noted at Camp Lake, where they probably made up two-thirds of the population given above. The specimens compare well with topotypical material from Churchill.

TABLE 19.—POPULATIONS OF SAVANNAH SPARROW

| | Area bush | No. seen | No. Collected | Estimated no. p. sq. mi. land |
|------------------------|-----------|----------|---------------|-------------------------------|
| Neck Lake | 100% | 1 | 1 | |
| Sandhill Lake | 80% | 20 | 2 | 10 |
| Malaher Lake | 20% | 40 | 1 | 60 |
| Boundary Lake | 4% | 3 | | 20 |
| Tha-anne River | 20% | 8 | | 25 |
| South Henik Lake | 6% | 20 | | 65 |
| Camp Lake | Barren | 105 | 5 | 150 |
| Carr Lake | " | 20 | | 40 |
| Alder Lake | " | 11 | | 30 |
| Victory Lake | " | 25 | | 70 |
| Derby Lake | " | 1 | 1 | ? |

Slate-coloured Junco.

Junco hyemalis hyemalis (Linnaeus). — At Sandhill Lake, 13 slate-coloured juncos were seen and 2 collected. They were observed in all habitats excepting the completely barren areas. The estimated population was 8 to the square mile.

Eastern Tree Sparrow.

Spizella arborea arborea (Wilson). — (Table 20).—At Sandhill Lake tree sparrows were seen in all habitats, but they were most numerous at the edge of the spruce forest, especially where there was low spruce scrub. Two nests were found, both on the ground. The first on June 28 at Sandhill Lake, contained 5 eggs, and the other on July 11, at Malaher Lake, 4 eggs. At the stations where there were only a few scattered spruce, tree

sparrows clung to these patches to a greater extent than the Savannah sparrows, but they were more often seen feeding on the barren areas than were the Harris' sparrows. This adaptability is reflected in their continued distribution north of the tree line. No young tree sparrows were definitely identified as such.

The 8 specimens collected were in worn summer plumage and therefore unsatisfactory for subspecific determination. They compared better with Churchill specimens of *S. a. arborea* than with Yukon specimens of *S.a. ochracea* in similar plumage. The mean measurements are as follows: four males, wing (chord) 73.7 (72-75) mm., tail 66.0 (64-68) mm; four females, wing (chord) 69.8 (68-71) mm., tail 62.8 (62-63) mm.

TABLE 20.—POPULATIONS OF EASTERN TREE SPARROW

| | Area bush | No. seen | No. Collected | Estimated no p. sq. mi. land | Estimated no. p. sq. mi. bush |
|------------------------|-----------|----------|---------------|------------------------------|-------------------------------|
| Sandhill Lake | 80% | 70 | 4 | 40 | 40 |
| Malaher Lake | 20% | 125 | 2 | 85 | 350 |
| Boundary Lake | 4% | 15 | | 15 | 220 |
| Tha-anne River | 20% | 24 | | 30 | 150 |
| Boulder Lake | 5% | 80 | | 40 | 400 |
| South Henik Lake | 6% | 25 | | 80 | 400 |
| Camp Lake | Barren | 16 | 2 | 23 | |
| Carr Lake | " | 8 | | 16 | |

Harris' Sparrow.

Zonotrichia querula (Nuttall). (Table 21).— I found two nests at Sandhill Lake, both on the ground amongst low spruce. The first contained 4 eggs on July 1; the other had 4 eggs on July 4. Two young just out of the nest were seen at Tha-anne River on July 19, but I do not think enough young birds

were on the wing before we left South Henik Lake to affect the population appreciably.

At Sandhill Lake Harris sparrows were most numerous among the low spruce trees and scrub at the edge of the barren areas, although also occurring in the main forests. On the semi-barrens north of Sandhill Lake they were seldom seen far from a patch of spruce or tamarack.

TABLE 21.—POPULATIONS OF HARRIS' SPARROW

| | Area bush | No. seen | No. collected | Estimated no p. sq. mi. land | Estimated no. p. sq. mi. bush |
|------------------------|-----------|----------|---------------|------------------------------|-------------------------------|
| Sandhill Lake | 80% | 100 | 8 | 35 | 35 |
| Malaher Lake | 20% | 95 | 1 | 40 | 200 |
| Boundary Lake | 4% | 12 | | 8 | 130 |
| Tha-anne River | 20% | 28 | 1 | 25 | 130 |
| Boulder Lake | 5% | 105 | | 20 | 400 |
| South Henik Lake | 6% | 20 | | 50 | 400 |



FIG. 8. The quartzite ridge at South Henik Lake. Dwarf willow and spruce scrub is growing near the lake in the middle distance and a few spruce trees can be seen under the hills. In the foreground dwarf birch outlines the earth polygons.



FIG. 9. Dwarf birch at Alder Lake. A similar growth covered large areas at Camp and Victory Lakes.

Gambel White-crowned Sparrow.

Zonotrichia leucophrys gambelii (Nuttall).— Three white-crowned sparrows were seen together at Sandhill Lake, and one was collected. At the Tha-anne River one nest with one young was found on the ground amongst some dwarf birch. The other young had flown. This was on July 18. I thought I saw one other pair there. Two pairs were seen at South Henik Lake. Both were probably nesting. A male was collected. The scarcity of white-crowned sparrows in this region is surprising. The two specimens collected are clearly the western form *Z. l. gambelii*.

Fox Sparrow.

Passerella iliaca (Merrem). — At Sandhill Lake, 18 fox sparrows were seen. They favoured the same habitats as Harris' sparrows, but differed greatly in behaviour. The latter are bold and perky and delight in showing off, while the fox sparrow quietly glides from one hidden perch to another. A nest was found on the ground in the open, but close to low spruce scrub. It contained 4

eggs on July 5. Three fox sparrows were collected at Sandhill Lake. The population was estimated to be 8 to the square mile. At Malaher Lake, 3 birds were thought to be fox sparrows, but not certainly identified as such.

Lapland Longspur.

Calcarius lapponicus lapponicus (Linnaeus). —(Table 22).—Young longspurs were first seen on the wing at Camp Lake. There they accounted for about one-fourth of the population. This increased to half at Carr Lake, and I think about three-fourths at all stations after that. At Alder Lake, the first small flocks of 4 to 6 individuals were seen. At Victory Lake and points thereafter, all the longspurs were in small flocks. About 12 birds was the largest flock seen. In 1930, Porsild (MS) saw full-grown young about the upper Tha-anne River on July 11-12, and at Yathkyed Lake on July 30. The majority of my 14 specimens were males in worn summer plumage. They matched specimens of *C. l. lapponicus* in similar plumage from Baffin Island better than they did *C. l. alascensis* from Alaska.

TABLE 22.—POPULATIONS OF LAPLAND LONGSPUR

| | Area bush | No. seen. | No. collected | Estimated no. p. sq. mi. land |
|-------------------------|-----------------------|-----------|---------------|-------------------------------|
| Malaher Lake | 20% | 113 | 4 | 150 |
| Boundary Lake | 4% | 60 | | 250 |
| Tha-anne River | 20% | 35 | | 110 |
| Boulder Lake | 5% | 62 | 3 | 120 |
| South Henik Lake | 6% | 30 | | 60 |
| | (including juveniles) | | | |
| Camp Lake | Barren | 100 | 5 | 90 |
| Carr Lake | " | 40 | | 50 |
| Alder Lake | " | 55 | 1 | 100 |
| Victory Lake | " | 30 | | 50 |
| Lake Ninety-seven | " | 12 | | 70 |
| Twin Lake | " | 30 | 2 | 80 |
| Smoke Lake | " | 30 | | 150 |
| Baker Lake Post | " | 50 | | 150 |

Eastern Snow Bunting.

Plectrophenax nivalis nivalis (Linnaeus). — Six snow buntings were seen in two groups at Lake Ninety-Seven. They were probably migrants. In July 1930, Porsild (MS) found this species breeding and fairly common along the west coast of Hudson Bay: but it was very scarce in the interior during August and he saw only a few birds along the Kazan River.

ANNOTATED LIST OF MAMMALS

Eastern Arctic Weasel.

Mustela erminea sempei, Sutton and Hamilton.—We saw no weasels and no traps were set for them before Alder Lake. At each station after that a single number 1½ trap was set. Five weasels were trapped and one shot: 2 at Alder Lake, 2 at Victory Lake, 1 at Twin Lake and 1 at Smoke Lake. One

other weasel was seen at Victory Lake and one at Twin Lake. North of Alder Lake weasels were probably more numerous than normal this year (using Southampton and Baffin islands, Repulse Bay and northern Quebec for comparison).

All six specimens were within the range assigned to *M.e. semplei* by Hall (1945), but near where it joins *M.e. arctica* and *M.e. richardsonii*. R. M. Anderson (*in litt.*) refers them to *M.e. semplei* and points out that the skulls are separable from those of *richardsonii* in having the broad frontal region typical of *arctica*, but are smaller than those of this race from near the type area. The measurements of the 5 adult males⁹ taken in the flesh are: head and body 221 (210-232) mm.; tail, 82 (71-90) mm.; hind foot and claw, 45 (44-48) mm. These, especially the hind foot measurement, are considerably larger than those given by Sutton and Hamilton (1932) for topotypes of *M.e. semplei*.

Parry's Ground Squirrel.

Citellus parryii parryii (Richardson). — Two specimens were collected at the Tha-anne River and Alder Lake, and one at Carr, Victory and Twin lakes. No ground squirrels or their burrows were seen south of our station on the Tha-anne River. There and at all stations north of there except Derby Lake (where the ground in the vicinity of the camp was too rocky), there were numerous fresh burrowings. A total of about 12 ground squirrels were seen besides the 7 collected.

Red Squirrel.

Tamiasciurus hudsonicus (Erxleben). — At Sandhill and Malaher lakes there were old heaps of spruce cone husks, and sometimes on or about these heaps fairly fresh spruce bough tips 2 to 3 inches long. This appears to be evidence of the recent presence of squirrels, but none were seen, and only once at Sandhill Lake did I think I heard one of these usually noisy and conspicuous animals.

Beaver.

Castor canadensis Kuhl. — A beaver was seen at Neck Lake and several of the birch in the neighbourhood of our camp had been felled by them. No signs of beaver were seen elsewhere.

Back's Brown Lemming.

Lemmus trimucronatus trimucronatus (Ri-

chardson). — Two Back's lemmings were caught at Victory Lake and one at Twin Lake. At Christopher Island one was obtained from the nest of a rough-legged hawk. No record of the number of trap nights at each station was kept, but at Neck Lake and each of the stations visited thereafter, an average of 7 mouse traps were set and from June 19 when we arrived at Neck Lake until August 26 when we left Baker Lake, not more than four nights passed without traps being set. This will give some idea of the relative abundance of this and the following small mammals. Except at Sandhill and Malaher lakes, the traps were always set within a quarter of a mile from camp. Considering this and the short periods spent at some of the stations the failure to collect a species at a particular station cannot be considered as more than an indication of its scarcity. However, I think that the distribution of all the small rodents was rather sporadic.

Lemmings' (*Lemmus* or *Dicrostonyx*) burrows were very numerous at Boundary Lake, Victory Lake and at Baker Lake post. Several recently used burrows were seen at Malaher Lake, Carr Lake, Lake Ninety-seven, Twin Lake and Christopher Island. Elsewhere there was very little or no recent sign of lemmings in the areas walked over. Except at Victory Lake, the specimens taken indicate that most of the burrows belonged to *Dicrostonyx*.

Greenland Varying Lemming.

Dicrostonyx groenlandicus groenlandicus (Traill). — This year *Dicrostonyx* was commoner and more widely distributed than *Lemmus*, but they were numerous only in a few places. Chief of these was Baker Lake. Twelve specimens were obtained at Baker Lake in 15 trap nights. The skins of these were compared with those from northern Melville Peninsula and southern Baffin Island. The 5 adult specimens were referable to *D.g. groenlandicus*, although showing some gradation towards *D.g. richardsoni*. The juveniles and sub-adults, though less distinctive, also match best with *groenlandicus*. A larger adult male, a near adult female and a juvenile from Twin Lake were indistinguishable from similarly aged Baker Lake specimens.

Richardson's Varying Lemming.

Dicrostonyx groenlandicus richardsoni Merriam. — Seven specimens of this subspecies were taken: 2 at Malaher Lake, 1 at Boundary Lake, 2 at Carr Lake, 1 at Victory Lake,

⁹ One specimen was not sexed in the field, but its large size suggests this sex.

and 1 at Lake Ninety-seven. They are clearly *D.g. richardsoni*, though slightly less rusty than Churchill skins. It is notable that the large male from Lake Ninety-seven was just as rusty as the specimens from Malaher Lake and quite distinct from the Baker Lake specimens. Porsild's specimens from the Kazan River were also very distinct from the Baker Lake material. This suggests a fairly abrupt boundary between *D.g. richardsoni* and *D.g. groenlandicus*, running through Baker Lake and east to half way along Chesterfield Inlet, and then bending south-east to include Twin Lake in the range of *groenlandicus*. The new specimens therefore support the boundary given by Anderson and Rand (1945).

MacKenzie Phenacomys.

Phenacomys ungava mackenzii Preble. — A single female was collected near the edge of the bush at Malaher Lake on July 9. This appears to be the first specimen of this genus recorded for the district of Keewatin. There are previous records for Churchill and a little north of Fort Rae (Anderson 1942).

Hudsonian Red-backed Mouse.

Clethrionomys gapperi hudsonius Anderson. — This species was collected only at Sandhill Lake. At this station traps were widely spaced in various types of habitat, but the 8 specimens collected were all caught within one area close to the water, and five of them were taken within 24 hours. One specimen exhibited the grey colour phase; the remainder were the more usual red.

Dawson's Red-backed Mouse.

Clethrionomys dawsoni dawsoni (Merriam). — Eight specimens were taken at Victory Lake in 8 trap nights. They were numerous in a small area close to a large heap of boulders pushed up by the ice, but I do not think they were widely distributed in large numbers over the surrounding tundra. At Smoke Lake none were caught the first night the traps were put out, but the following night 5 were taken in 7 traps.

Varying Hare.

Lepus americanus Erxleben. — F/L Carr saw a varying hare near our camp at Sandhill Lake. I saw none, but there were a few runways at Malaher Lake and stations south of there.

Arctic Hare.

Lepus arcticus Ross. — Arctic hares were rather scarce even taking into account the

difficulty with which they can be seen in July and August. I saw only one, a rather dark individual, on top of the hills at the north end of South Henik Lake.

Deer.

Odocoileus sp. — There were numerous droppings of deer at Big Sand and Neck lakes.

Moose.

Alces americana (Clinton). — Moose droppings were quite plentiful at Big Sand and Neck lakes. No droppings were seen north of that.

Barren Ground Caribou.

Rangifer arcticus (Richardson). — Between Eyrie Lake and Baker Lake we flew about 1,000 miles in straight line distances between observing stations. We were also in the air photographing for over half an hour at each station. While photographing, we were at 2,000 to 4,000 feet, and while moving from station to station we were usually over 3,000 feet when weather permitted. At this height over the barren grounds, large herds of 200 or more caribou can readily be seen a mile or so away if a careful watch is being kept, but small herds and individuals, especially if they are lying down or standing still, may escape notice. The following details of caribou and caribou signs observed at each station are recorded in the order in which the stations were visited.

Eyrie Lake, June 14-16. Camped on an area of 1-2 square miles of caribou lichen. Trails were numerous, and the lichen was grazed and beaten to the ground.

North end of Big Sand Lake, June 16-19. Trails were very numerous through the undergrowth. Judging by the number of droppings along these trails, they had been made chiefly by caribou, although moose and deer were also present. Lichen-covered area was seen only from the air. I saw one caribou carcass.

Neck Lake, June 19-22. The above remarks on trails apply equally here. Caribou lichen was everywhere grazed to the ground.

Sandhill Lake, June 22-July 6. In the dryer forest areas, caribou lichen grew plentifully, but everywhere it had been so heavily grazed and trampled that it seemed unlikely to be of much benefit to caribou for some years in the future. Caribou paths were

¹⁰⁾ Downes (1943) makes frequent references to caribou and caribou trails along his 1940 route from Brochet to Nueltin Lake. When in sandy country similar to that at Sandhill Lake but about 100 miles west of there, he remarks on the hundreds of caribou trails (p. 130).

very numerous¹⁰. A large trailing lichen that grew plentifully on the spruce trees had not been much eaten.

Malaher Lake. July 6-14. Caribou lichen was not very plentiful here, and the little there was had been very heavily grazed. Trails were numerous, but slightly overgrown as if the number of caribou which had passed there in the last two or three years had been fewer than formerly. There were still signs of large numbers, however, and I saw six carcasses of large male caribou from the preceding fall.

Boundary Lake. July 14-15. Caribou lichen was scarce. Caribou trails were fairly numerous.

Tha-anne River. July 16-20. Caribou trails were numerous, and lichen very heavily grazed.

Boulder Lake. July 20-24. There was not much caribou lichen here. It was very heavily grazed and torn up. Numerous and recent caribou trails showed that a large herd had passed within the last few weeks. I saw about a dozen carcasses left from the fall.

North end of South Henik Lake. July 24-26. Caribou trails were very numerous and probably more recent than at Boulder Lake. Caribou lichen was fairly plentiful, but very heavily grazed and torn up except for a few small clumps amongst rocks or on small scree slopes. Although growing in apparently unfavourable conditions, these clumps of lichen were luxuriant, and showed that the poor development elsewhere was due to heavy grazing. I saw four recently dead carcasses.

Camp Lake. July 25-Aug. 2. Caribou trails were fairly numerous. Caribou lichen was heavily grazed, torn up, and not very plentiful. On August 2, we saw a herd of about 200 caribou from the air within about 10 miles of this station.

Carr Lake. August 2-6. I saw one caribou here on August 2 and a straggling herd of about 30 on August 5. F/L Carr, flying from the Kazan River on August 6, saw large numbers of caribou west of Padlei. It is hard to compare the trails in the bush with those on the barrens, but I think more caribou had passed here than any place previously visited. At the ends of lakes, paths converged from all directions, and the marsh was trampled into mud. I saw a few carcasses.

Alder Lake. Aug. 6-10. There were only small areas of caribou lichen here, but in striking contrast to the above stations, these

small patches had scarcely been grazed. Caribou trails were fairly numerous, particularly in the rocky areas where they may have survived for many years.

Victory Lake. August 10-15. There were even more caribou trails here and the ground had been more churned up than at Carr Lake. There was not much caribou lichen, and here and at Carr Lake the caribou had been feeding on dwarf birch shoots.

Derby Lake. Aug. 15-16. We saw a herd of about 50 caribou from the air near this station, and caribou trails appeared quite numerous. There was no opportunity to examine the country on the ground.

Lake Ninety-seven. Aug. 16-17.

Twin Lake. Aug. 17-21. There was very little time to examine these points on the ground. Caribou trails were fairly numerous, but there was not much lichen. An Eskimo whom we met at Twin Lake said that "many caribou" had passed a few days before. This may have been anything from 50 up.

Smoke Lake. Aug. 21-22. I saw no trails from the air or ground, but they would not show up well on this rocky country, and I went for only one short walk.

Christopher Island. August 22-23.

Baker Lake Post. August 23-26. There were some very recent tracks on the shore of Christopher Island, but time did not permit a visit inland.

Within a mile or two of Baker Lake post, there was little sign of recent visits by caribou, a condition to be expected in the neighbourhood of a settlement of that size. Corporal Hamilton, R.C.M.P., said that last year he had seen very large numbers of caribou crossing Chesterfield Inlet at its western end.

Summary: Very large numbers of caribou had passed the following points: Eyrie Lake, north end of Big Sand Lake, Neck Lake, Sandhill Lake, Malaher Lake (perhaps not so many as formerly), the Tha-anne River, Boulder Lake, north end of South Henik Lake, Carr Lake, Victory Lake. The caribou had left the region of the first four lakes at least some weeks previous to our arrival at them (June 14-July 6). The main herds had left Boulder, Henik, Carr and Victory lakes only shortly before our arrival (July 20-August 10). Numerous caribou were seen by F/L Carr just west of Carr Lake on August 6. We were not long enough at any point north of Alder and Victory lakes to draw any conclusions except that there had been no great migration through there.

North of Sandhill Lake, caribou lichen was not very plentiful, and it can only have formed a subsidiary item of food.

Boundary Lake and Camp Lake appear to be a little east of the main migration, though caribou had obviously been quite plentiful and a herd of 200 was seen at Camp Lake on August 2. There did not appear to have been many caribou in the vicinity of Alder Lake for some years.

Along the main caribou migration route and in some summering and wintering areas the vegetation has been very heavily grazed. In these areas the caribou moss was everywhere torn up by trampling, which to some extent, perhaps, accounts for its sparseness on the barrens and about the edge of the bush north of Sandhill Lake. Similar situations in Ungava where caribou are now seldom seen were clothed with a luxuriant growth of reindeer moss (Manning 1946).

In some areas mentioned above, the caribou population is as large as the land will carry. It is important to know whether this is a healthy condition and whether the caribou will enter the less heavily grazed regions if their present central region should become over-grazed, or whether they are held to their present range by hunters in the north and east and by fires and hunters in the south, south-east and west¹¹.

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¹¹) Since the above was written I have been told by members of Exercise Musk-Ox that during the fall and winter of 1945-1946, caribou were very scarce in the Baker Lake, Kazan River, Padlei region, but comparatively numerous about Tavani.

SEVENTIETH ANNUAL MEETING OF THE OTTAWA
FIELD-NATURALISTS' CLUB

REPORT OF COUNCIL

Since the last Annual Meeting there were five meetings of Council as follows:

December 7th, 1946, at St. Patrick's College, with 17 members present; January 25th, at St. Patrick's College, with 10 members present; May 21st, at St. Patrick's College, with 11 members present; October 25th, at the home of Dr. Pauline Snure, with 11 members present; and November 29th, at St. Patrick's College, with 13 members present.

Appointments were made for 1947 as follows:

Editor of the "Canadian Field-Naturalist"
— Dr. H. A. Senn.

Curator of back numbers — A. W. F. Banfield.

Chairman of Publications Committee — Dr. A. L. Rand.

Chairman of Excursions and Lectures Committee — Dr. Pauline Snure.

Chairman of Special Lecture Committee — O. H. Hewitt.

Chairman of Membership Committee — Dr. V. E. F. Solman.

Chairman of Reserve Fund Committee — E. F. G. White.

Chairman of Bird Census Committee — O. H. Hewitt.

The preservation of natural conditions in various attractive areas about the city was discussed. Dr. Savile was requested to investigate the plans which the Hydro Company might have for their property on the Ottawa River near Britannia.

The Royal Canadian Mounted Police Memorial and Indian Museum of Battleford, Saskatchewan, was accepted as an affiliated Society.

The Editor's Honorarium was increased from \$50 to \$100.

Principally through the efforts of Dr. Frankton and Mr. Cody, all back numbers of the Naturalist were put in order and back orders were filled to date.

Mr. Cody was appointed Assistant to the Treasurer.

Mr. A. E. Porsild was named Chairman of the Publications Committee to replace Dr. Rand, who has left Ottawa.

W. E. Godfrey was appointed Associate Editor in Ornithology.

It was decided that the Club should undertake an active membership campaign.

Report of Publications Committee

Since December 1, 1946, eight numbers of the Canadian Field-Naturalist have been published. These include the last three numbers of volume 60, and the first five of volume 61. The total numbers of pages, 254. Papers, notes and reviews were distributed as follows:

| | Papers | Notes | Reviews |
|----------------------|--------|-------|---------|
| Ornithology | 13 | 27 | 1 |
| Mammalogy | 5 | 6 | 1 |
| Botany | 8 | 4 | 4 |
| Invertebrate Zoology | 2 | 2 | 1 |
| Entomology | 1 | 1 | |
| Ichthyology | 1 | 1 | |
| Herpetology | | 1 | |
| Miscellaneous | 3 | | 2 |

Seven maps and 23 other illustrations were used.

During the year arrangements were made with LE DROIT in Ottawa to print the Canadian Field-Naturalist. LE DROIT has given very good service even though they were unfamiliar with the printing of scientific material. It has been largely through the cooperation of the staff of LE DROIT that we have been once more able to publish on time.

Report of the Excursions and Lectures Committee

Three meetings of the Committee were held during the year. Six lectures were given as follows:

- January 16 — Some problems in game fish management by Dr. V. E. F. Solman.
- February 27 — Wildlife on the Rocky Mountains by Dr. I. McT. Cowan.
- March 8 — Adventures with American Wildlife by Cleveland Grant.
- April 17 — Why birds behave as they do, by Dr. A. E. Conway.
- October 16 — Reports on summer activities by Mr. Breitung, Mr. Dore, Mr. Godfrey, and Dr. Savile.

November 20 — A journey down the Mackenzie River and a visit to the Reindeer Reserve, by A. E. Porsild.

The meeting of March 8, arranged in co-operation with the Ottawa Fish and Game Association, was held in the Glebe Collegiate Auditorium.

Between May 6 and June 10, six early morning bird walks to the Experimental Farm were held.

Eight Saturday afternoon excursions were held as follows:

Spring

- May 3 — Experimental Farm.
- May 10 — Britannia.
- May 17 — Billing's Bridge.
- May 31 — Taylor's Hill.
- June 7 — McKay Lake and vicinity.

Fall

- Sept. 13 — Maplewood Nurseries.
- Sept. 20 — Britannia.
- Sept. 27 — Ski Trail, Fairy Lake.

A new feature of the excursions has been that each one has been in charge of a special leader who makes all arrangements for additional leaders, route to be followed, etc., after the committee has made these general plans. This system has been very successful.

Early in 1947 season it was decided that if enough persons were interested, two groups

would be formed to study seriously birds and some aspects of botany. A bird group was formed and has been very active. Mr. A. E. Bourguignon, Dr. Savile and Mr. Godfrey have done much to make this a success.

The committee wishes to thank those who have given lectures, those who have acted as leaders on bird walks and excursions, and those who have in many other ways assisted the committee in carrying out its duties. Thanks are extended to the Ottawa Journal and the Evening Citizen for press reports and to stations CKCO and CFRA for announcements of meetings. Thanks also are extended to Mr. Bourguignon and to Father Banim for hospitality in providing places for the committee to meet.

Receipts were \$55.00 and expenditures \$43.02, leaving a balance on hand of \$11.98.

Report of Bird Census Committee

The Christmas Bird Census was taken on December 22nd, 1946. A total of 28 species and 4114 individuals was reported. 22 members participated. The Bird Census report for all of Canada was published in the March-April issue of the Canadian Field-Naturalist.

Report of Membership Committee

During the past year, 19 new members have been accepted.

(signed)

W. H. Lanceley,
President.

O. H. Hewitt,
Secretary.

INTERNATIONAL CONGRESS OF ZOOLOGY

The Thirteenth International Congress of Zoology will meet in Paris from July 21 to July 27, 1948. There will be ten sections as follows:

- I. General Zoology.
- II. Evolution and Genetics.
- III. Cytology and Protistology.
- IV. Comparative and Experimental Embryology.
- V. Vertebrates (in two subsections)

- a) Comparative Anatomy
- b) Taxonomy and Ecology.

- VI. Invertebrates except Insects.
- VII. Entomology.
- VIII. Applied Zoology and Parasitology.
- IX. Zoogeography and Palaeontology.
- X. Nomenclature.

Correspondence concerning the Congress should be addressed to: Secrétaire Général, M. Fischer-Piette, Professeur au Muséum, 55, Rue de Buffon, Paris 5, France.

STATEMENT OF FINANCIAL STANDING

OTTAWA FIELD-NATURALISTS' CLUB, DECEMBER 1, 1947

CURRENT ACCOUNT

ASSETS

| | |
|-------------------------------|--------|
| Balance in Bank, Dec. 1, 1947 | 151.48 |
| Bills Receivable | 309.48 |
| | <hr/> |
| | 460.96 |

LIABILITIES

Nil

RECEIPTS

| | |
|-------------------------------|---------|
| Balance in Bank, Dec. 3, 1946 | 670.33 |
| Fees:— | |
| Current | 897.95 |
| Advances and Arrears | 199.90 |
| Assoc. Members | 20.00 |
| | 1117.85 |
| Separates | 168.59 |
| Illustrations | 10.88 |
| Single and Back Numbers | 369.25 |
| Transferred from Public. Fund | 90.00 |
| Transferred from Reserve Fund | 90.00 |
| Miscellaneous | 25.90 |
| | <hr/> |
| | 2542.80 |

EXPENDITURES

| | |
|------------------------|---------|
| Canadian Field-Nat. | 1435.24 |
| Editor | 100.00 |
| Curator | 15.00 |
| Separates | 245.38 |
| Illustrations | 193.35 |
| Exc. and Lecture Comm. | 52.53 |
| Postage and Stationery | 264.05 |
| Bank Discount | 18.45 |
| Miscellaneous | 67.32 |
| Balance in Bank | 151.48 |
| | <hr/> |
| | 2542.80 |

RESERVE FUND

ASSETS

| | |
|-------------------------------|---------|
| Canadian Government Bonds | 1600.00 |
| Balance in Bank, Dec. 1, 1947 | 211.17 |
| | <hr/> |
| | 1811.17 |

LIABILITIES

Nil

RECEIPTS

| | |
|-------------------------------|--------|
| Balance in Bank, Dec. 3, 1946 | 31.48 |
| Bond Interest | 67.50 |
| Bank Interest | .69 |
| Sale of Bonds | 204.50 |
| | <hr/> |
| | 304.17 |

EXPENDITURES

| | |
|--------------------------------|--------|
| Rent Deposit Box | 3.00 |
| Transferred to Current Account | 90.00 |
| Balance in Bank, Dec. 1, 1947 | 211.17 |
| | <hr/> |
| | 304.17 |

PUBLICATION FUND

ASSETS

| | |
|-------------------------------|---------|
| Canadian Government Bonds | 1300.00 |
| Balance in Bank, Dec. 1, 1947 | 52.60 |
| | <hr/> |
| | 1352.60 |

LIABILITIES

Nil

RECEIPTS

| | |
|-------------------------------|--------|
| Balance in Bank, Dec. 3, 1946 | 40.40 |
| Bond Interest | 51.00 |
| Bank Interest | 1.35 |
| Life Membership | 50.00 |
| | <hr/> |
| | 142.75 |

EXPENDITURES

| | |
|--------------------------------|--------|
| Transferred to Current Account | 90.00 |
| Bank Discount | .15 |
| Balance in Bank, Dec. 1, 1947 | 52.60 |
| | <hr/> |
| | 142.75 |

Audited and found correct
(signed) I. L. Conners,
Harrison F. Lewis,
AUDITORS.

C. Frankton,
TREASURER.

December 1, 1947.

STATUS OF THE MONTANA JUNCO (*Junco oreganus montanus*) IN ONTARIO¹

By A. A. Wood

Chatham, Ontario

THE FIRST recorded specimen of the Montana junco for the province, a female, was taken by me at Strathroy on March 26, 1929. Apparently, no other specimens were collected for fourteen years, when Mr. T. M. Shortt secured a male at Streetsville on February 27, 1943. This year saw a movement of the birds, both in the spring and fall, as all the remaining records occurred in 1943. The third specimen, a male, was taken by Dr. E. L. Brereton at Barrie on March 6. This bird was seen at a feeding station by Mrs. O'Brien-Saint, on February 23, as recorded by Mr. O. E. Devitt in "The Birds of Simcoe County" (Trans. Roy. Can. Inst., October 1943-44).

These records stimulated my interest in juncos sufficiently to get me into the field the spring of 1943 to do some work on the flocks of juncos which were passing through. On March 30, in company with Dr C. C. Bell of Chatham, I went to Rondeau Provincial Park and located a flock of about 200 juncos feeding under the shrubbery along the lake shore, east of the Park. With Dr. Bell's excellent glasses, I carefully worked over the entire flock, securing two with "pink" sides, proving to be females of the subspecies *montanus*. A much brighter individual, probably a male, was seen in this flock but

was not secured. On April 21, near the outskirts of Chatham east, along the River Thames, two more females were obtained. Dr. Brereton succeeded in collecting a female at Barrie on October 17. All these specimens, with the exception of the two from Barrie, were determined by Dr. Alden H. Miller of California. The Barrie specimens are in the collection of Mr. O. E. Devitt, Toronto, who wrote me that Mr. T. M. Shortt worked these over and decided that they were certainly *montanus*. The present locations of these specimens are:

1. Strathroy, March 9, 1929. ♀ Collected by A. A. Wood (R.O.M.Z. Coll.)
2. Streetsville, February 27, 1943. ♂ Coll. T. M. Shortt (R.O.M.Z. Coll.)
3. Barrie, March 6, 1943, ♂ Coll. Dr. E. L. Brereton (O. E. Devitt Coll.)
4. Rondeau, March 30, 1943. ♀ Coll. by A. A. Wood (A. A. Wood Coll.)
5. Rondeau, March 30, 1943. ♀ Coll. by A. A. Wood (A. A. Wood Coll.)
6. Chatham, April 21, 1943. ♀ Coll. by A. A. Wood (A. A. Wood Coll.)
7. Chatham, April 21, 1943. ♀ Coll. by A. A. Wood (A. A. Wood Coll.)
8. Barrie, October 17, 1943. ♀ Coll. by Dr. E. L. Brereton (O. E. Devitt Coll.)

¹ Received for publication December 1, 1945.

NOTES ON A TRIP TO SABLE ISLAND, N. S.¹

By W. W. JUDD

McMaster University, Hamilton, Ont.

WHILE EMPLOYED as a meteorologist at the R.C.A.F. station, Dartmouth, N.S., I had an opportunity of visiting Sable Island for a short time on February 18, 1945. The trip was made by air. The plane took off from Dartmouth early in the afternoon and flew over the ocean at about 1000 feet. Visibility was good in all directions except when the plane passed through scattered patches of low cloud.

Sable Island first appeared as a white line on the eastern horizon and on closer approach as a long sand bar with outlying shoals over which breakers were curling. As the plane approached the western end of the island a herd of several hundred seals was seen to leave the end of the island and the shoals and plunged into the water.

After circling over the western tip of the island a few times the plane was landed on a long sandy beach between the ocean and one of the salt-water lagoons which extend lengthwise down the island.

During my short stay I was able to collect a few plants. It being mid-winter, all vegetation was brown and withered except some evergreen plants. *Empetrum nigrum* L. (Crowberry) was abundant on the sand dunes away from the beaches and *Mitchella repens* L. (Partridge Berry) was found in small clumps. Another interesting species collected was *Calluna vulgaris* L. (Heather) found in patches among the growth of Crowberry. These three species are included in St. John's list (1) of plants of Sable Island. He reports (1, 2) that *Calluna vulgaris* is an adventive species and that records of its occurrence on the island come after the year 1901, when a large forestry planting was done. Many of the trees were imported from a French nursery and *Calluna* "was in all probability used for, or carried in, the protective packing around the trees". I also collected the fruit of a rose, probably *Rosa virginiana* Mill., which St. John reports as being very common on the more stable sand dunes throughout

the island. I took specimens of these four plants for my collection.

The Sable Island ponies were to be seen in a few groups of two or three at the western end of the island. They were small and had shaggy coats and long manes and tails. St. John (1) discusses the origin of the herds of ponies and gives evidence that horses of New England stock, together with other animals, were placed on the island by the Rev. Andrew LeMercier shortly before 1760, his design being to stock it with domestic animals which might be useful in preserving the lives of shipwrecked sailors. Thomas Hancock, a Boston merchant, also desiring to relieve shipwrecked mariners disembarked horses, cows and other animals on the island about 1760.

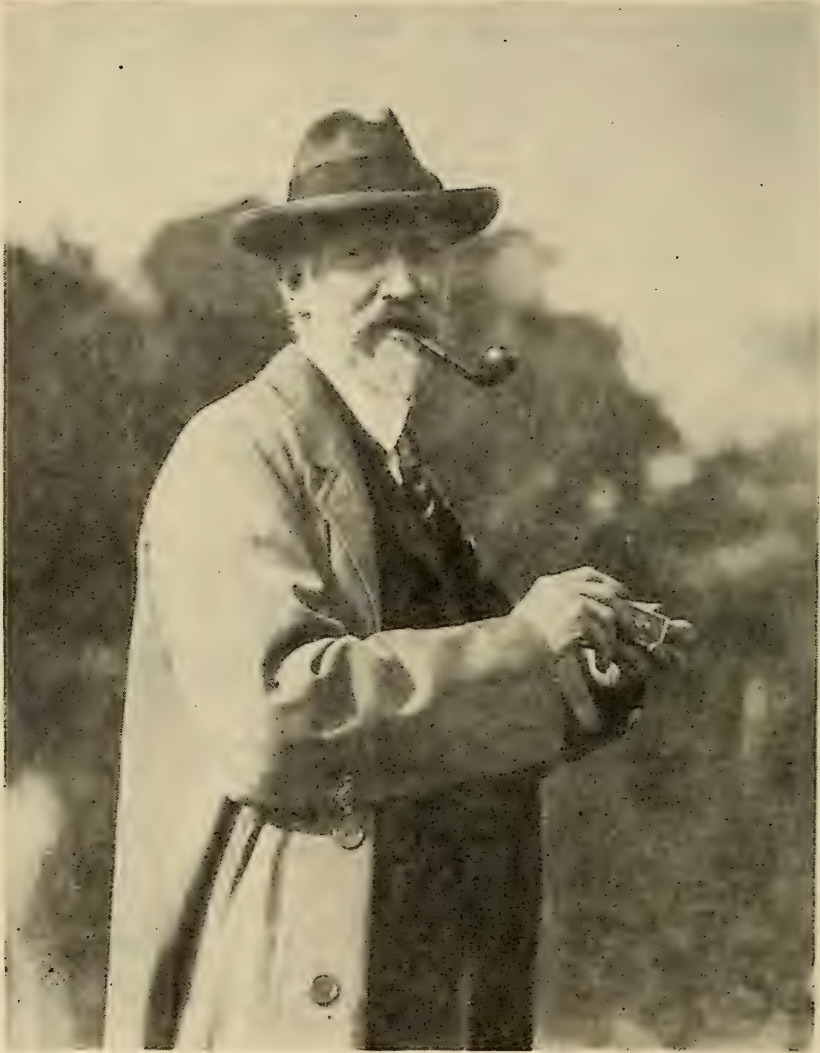
On returning to the plane through the sand dunes I noticed at a distance of about twenty yards a large light-coloured sparrow which flew for a short distance and then disappeared in the *Empetrum* heath, repeating this performance several times. On later reading the reports of St. John (1) and Saunders (3) it occurred to me that this might have been an Ipswich sparrow. However, beyond noting that it was considerably larger than such birds as the song sparrow or vesper sparrow, I did not take note of any of its features.

After having spent about an hour and a half on the island we boarded the plane and took off, circling once or twice to see the seals on the beach at the western end of the island and then headed for Dartmouth where we landed at dusk.

References

1. St. John, H. 1921. Sable Island, with a catalogue of its vascular plants. Proc. Boston Soc. Nat. Hist. 36:1-104.
2. St. John, H. 1929. *Calluna vulgaris*, a recent adventive on Sable Island, Nova Scotia. Jour. Bot. 67:306-307.
3. Saunders, W. E. 1902. Birds of Sable Island, N.S. Ottawa Naturalist 16:15-31.

¹) Received for publication January, 7, 1946.



P. A. TAVERNER

(1875 - 1947)

P. A. TAVERNER, AN APPRECIATION

1875 — 1947

By J. A. MUNRO

Okanagan Landing, B.C.

P. A. TAVERNER died on May 9, 1947, and the world is a poorer place without him. There were many who loved him, and a few who were his enemies — what better epitaph could any man desire? To his character that was unusual, and to his achievements that were substantial, these informal paragraphs are a tribute.

His old friends called him "Percy", and as "Percy" we shall think of him in affectionate remembrance. He had a genius for friendship. There was in him a warmth and an understanding to which men responded, and many confided in him. He had in him a zest for life — a life which he saw in broad and tolerant perspective. His interests covered a wide field. Upon matters of science, of music, of art, and of literature he held definite views. He expressed his viewpoint, often an unconventional or a sceptical one, in trenchant phrases. He was master of the *mot juste*.

He had a dignity that never became pompous; he had charm, and wit, and a humour that was original, spontaneous and, occasionally, ribald. He laughed often, at life, at himself, at sacred cows and noisy mountebanks. But at sincerity he did not laugh and he spoke ill of no man.

He was hospitable in the fashion of a more spacious and generous day; he liked good talk; he liked good food, good drink, and these he dispensed with a courtesy that added immeasurably to their value.

Deft fingers fashioned what his mind conceived; whether at sketching, at house-building, at book-binding, or at any craft calling for artistry and mechanical skill there was little those artist-hands could not perform.

For all these things we loved him.

Some of Taverner's writings have a philosophical content, a breadth of vision, that indicate the diversity and fruitfulness of his mind and of his thought processes. He made a deeper impress on Canadian ornithology, and probably exerted a greater influence on younger men, than did any of his contemporaries. A vigorous battle against the sublimation of the subspecies, fought with no little success, won many recruits. So also, he struck shrewd blows in the cause of wildlife conservation.

In a different category Taverner's Canadian bird books set a standard that few more recent works of this genre have equalled and that none has surpassed. These books, perhaps his most valuable contribution to Canadian ornithology, were conceived and executed along original lines. They set forth in condensed form, a wealth of detail and many aids, hitherto neglected, to the identification of species. Most of the short bird-biographies, a feature of the plan, contain original matter, and each holds the characteristic Taverner touch. For all this the student of birds was properly grateful. The "Birds of Canada" became the Canadian ornithologist's bible. It will always be a monument to his scholarship and industry.

His interest in ornithology never failed. In the last year, when illness had greatly restricted his activities, he wrote steadily, following a limited but regular schedule designed to conserve his strength.

I met Percy first at Okanagan Landing, British Columbia, in July, 1916; I saw him last in February, 1947, when he entertained a few old friends at his home in Ottawa. He seemed, on that last occasion, in good health. He talked well; he was charming and gracious as always. So I shall remember him.

DISTRIBUTIONAL NOTES ON CANADIAN MOLLUSCA¹

By A. LA ROCQUE

University of Michigan, Ann Arbor.

SINCE 1939 the writer has been engaged in the compilation of a checklist of Canadian Mollusca. The records in the literature have now been assembled and afford a means of checking new records for Canada and the range of previously recorded species. A number of miscellaneous additions to the list and extensions of range are discussed below for the benefit of those who may be interested in molluscan distribution in Canada.

1. *Aplexa hypnorum tryoni* Currier.—This variety of the widely distributed *Aplexa hypnorum* has not so far been recorded for Canada. There are two lots in the National Museum of Canada, one from Lower Fort Garry, Manitoba (NMC 2028), and the other from Lower Fraser River, B.C. (NMC 2297). Both of these were identified by W. J. Clench. The variety was described in the American Journal of Conchology 3: 112, 1867.

2. *Helisoma anceps latchfordi* (Pilsbry).—Up to a few years ago, this striking variety of *Helisoma anceps* was known only for the type locality, Meach lake, Quebec. The writer has collected specimens indistinguishable from the types in Gilmour lake, Algonquin Park. The specimens from Lake Memphramagog and Brome Lake, Quebec are so nearly similar to *H. anceps latchfordi* that they should probably be placed in the same variety.

3. *Somatogyrus subglobosus* (Say).—This species has been collected in the Ottawa river, at Duck island (J. Oughton, G. E. Fairbairn and A. La Rocque) and in Lake St. Peter, Saint Lawrence river (Saint-François-du-Lac and Notre-Dame de Pierreville, collected by L. Philippe). It is not common at either place, but seems to be well established in the St. Lawrence drainage. So far it has not turned up in the Rideau River, but might eventually do so. It is impossible to say whether this is a new introduction or whether it is so rare in the St. Lawrence drainage that it has escaped the attention of previous collectors.

4. *Bulimus tentaculatus* (Linn.).—Latchford was the first to record this species for the Ottawa region; his specimens were collected at Duck Island. Later (Can. Field-Nat. 49: 34) the distribution of this species was extended to include the Rideau River as far south as one mile above Black Rapids (south of Ottawa, Ontario) with many other records between that place and the Ottawa River. The writer has also collected specimens from one mile above Manotick and it will no doubt be found in the entire Rideau River and Canal since it occurs in the St. Lawrence river as far downstream as Lake St. Peter where it was collected by Mr. Lionel Philippe.

5. *Viviparus malleatus* and *Viviparus japonicus*.—These two species are discussed together as there seems to be some doubt about their specific distinctness (see Richards and Adams, Nautilus 42: 142). *Viviparus japonicus* was reported for the Chinese market at Victoria, B.C. as far back as 1894 and both species have been introduced on the Pacific Coast of the United States and at Boston and other places in Massachusetts; it has also been recorded for Philadelphia and lately from the Niagara river at Niagara Falls, New York (Schmeck, Nautilus 55: 102-103, January, 1942). The latter colony, if it survives, will probably spread to the Canadian side of the Falls, but there is no definite record of this as yet.

Specimens which appear identical with *Viviparus malleatus* were collected alive in Patterson Inlet, on the Rideau Canal, Ottawa, on the 19th of May, 1943, by a boy who brought in one specimen to the National Museum of Canada. The next day both live and dead specimens were collected by the writer in the pond at the end of the inlet above the bridge at the foot of First Avenue. On the same day, the water in the canal being low, its banks were examined from the foot of First Avenue to the Rideau Aquatic Club in one direction, and the Ottawa East bridge in the other. Neither living nor dead specimens were found in the canal below the First Avenue bridge. Thus

¹) Received for publication November 29, 1946.

it seems that this introduction was of recent date. The wide scattering of the specimens in the pond above the inlet seems to indicate that they had been put there the previous Fall, for the dead specimens were well filled with silt, which takes some time to accumulate; moreover, there was no sign of either the operculum or the animal in the dead specimens; if recently dead, both, or at least the operculum, should have been present.

As to how they came to be there, there is not much doubt. Hundreds of people in the city keep tropical fish in aquaria, together with water weeds and various kinds of exotic snails. Specimens of *Viviparus malleatus* are often sold by tropical fish dealers and it is very likely that some amateur aquarist, becoming tired of his pets, dumped the entire contents of his tanks into the inlet.

A second record of this species, this time from British Columbia, turned up recently. Mr. R. Glendenning of the Dominion Entomological Laboratory at Agassiz, B.C., sent in one specimen with the following note: "I enclose herewith a snail shell which I wish you would identify for me. It was taken from a small pond at Harrison Mills, some 10 miles west of here. The species is eagerly sought by the Chinese, who come from Vancouver and collect it in bucketfuls for some epicurean dish. The story goes that circa 1908 the Chinese boss, Tom, in charge of a gang of mill workers employed at the large sawmill that was operating at that time, planted these snails for this purpose..." Since then Mr. Glendenning has sent seven more specimens, with the animal and operculum, preserved in alcohol. Thus, thanks to his careful observations, we have a record not only of the presence of the species at this locality, but also the approximate date of the introduction and an idea of its productivity under depletion by heavy collecting.

6. *Allogona lombardii* (A. G. Smith). — After describing this species (Proc. Calif. Acad. Sci. 4th. ser. 23: 545, 1943) Smith adds: "Approaching it (*A. lombardii*) in type of sculpture, but not in size, is a lot of six shells from Boswell, Kootenay Lake, British

Columbia (C. A. S. 27, 064), which probably should take the same name." The type locality for *Allogona lombardii* is "Along Meadow Creek, 1½ m. south of Selway Falls, Idaho county, Idaho." It has also been found at Selway Falls, Idaho, so its occurrence in British Columbia would not be unexpected.

7. *Arion ater* Linn. — This species has previously been recorded for Newfoundland (Vanatta, Nautilus 38: 93, 1925, and Brooks, Ann. Carnegie Mus. 25: 93, 1936). It has also been found in British Columbia, near New Westminster, by Mr. R. Glendenning who collected it there in 1945.

8. *Arion circumscriptus* (Johnston). — Through Mr. Glendenning's efforts, British Columbia may now be added to the range of this species. It has previously been recorded for Newfoundland, Prince Edward Island, Nova Scotia, Quebec, and Ontario, as well as Maine, New York, Michigan, and Massachusetts. The British Columbia specimens came from Agassiz.

Arion circumscriptus appears to be immune to our severe winters. A colony in a garden at Manotick, thirteen miles south of Ottawa, was kept under observation for some years to ascertain its resistance to winter conditions. Adult specimens appeared as early as the 11th of April and many freshly laid egg clusters were seen. At that time slugs of the genus *Deroceras* had not yet appeared, though they were quite as abundant as *Arion* in the same garden the previous year; they made their appearance a little later in April and by May were as abundant as *Arion*.

9. *Limax maximus* Linn. — In recording the presence of this species in the Ottawa region (Can. Field-Nat. 52: 107) I could not say with certainty that it was able to overwinter in this area. The species was collected again in May 1940, in the same garden where it had originally been found; it appears, therefore, that it is able to survive over winter in the Ottawa region.

Specimens from British Columbia have been sent in by Mr. Glendenning from New Westminster and the Kootenay district.

OCCURRENCE OF A YELLOW-HAIRED SPECIMEN OF THE EASTERN PORCUPINE

(*Erethizon dorsatum dorsatum* L.) IN ONTARIO¹

By N. R. BROWN

University of New Brunswick, Fredericton, N.B.

ON July 31, 1946 the writer collected an unusual specimen of the eastern porcupine at Black Sturgeon Lake, Thunder Bay District, Ontario, about 90 miles north of Port Arthur. Skin and skull were submitted to Dr. A. L. Rand, Acting Chief, Biological Division, National Museum of Canada, Ottawa for identification and comments. Measurements of the specimen, a female thought to be about one year old, were: total length 570 mm., tail vertebrae 145 mm., hind foot 88 mm., ear from crown 19 mm.

The following remarks are taken from notes made by Dr. Rand concerning the specimen.

From the little-developed ridges and open sutures of the skull, the animal was young, probably about one year old. Skull measurements — interorbital breadth 26 mm., length of nasals 21.2 mm., width of rostrum midway, 19 mm. From the short, blunt nasals and the presence of the ridge on the rostrum, the skull is referable to the race *Erethizon dorsatum dorsatum* L.

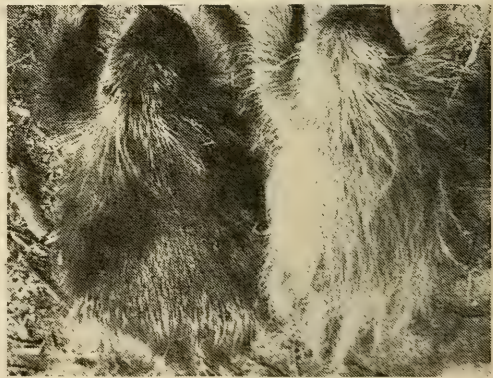
Despite the certain identity of the skull, the skin differs widely from any eastern skin (i.e. in the National Museum Collection). The guard hairs are much more abundant than in most eastern porcupines and in this respect resembles a western animal; however, it can be matched in this character by an adult from Quebec which is nearly all black.

The general ground colour is dilute, brownish or grayish-black with considerable white in the crown and on the sides of the head. The majority of spines on the lower back and upper side of the tail are white.

The guard hairs of the upper surface of the body are whitish-brown, more whitish toward the tips, and the hairs fringing the tail are whitish. The underside of the body is grayish-black and well-furred; the underside of the tail is grizzled brownish-black.

Compared with various western skins (of *myops*, *nigrescens*, *epixanthum*) in the National Museum Collection which resemble it most closely, the specimen is closest to some of the *myops* from Teslin Lake (e.g. No. 1937, N.M.C.). However, it differs in the shorter and less abundant guard hairs on the fore part of the body and the lesser amount of white in the spines of the sides of the body and the top of the neck, and in the generally brownish-white, rather than yellowish-white of the broad, abundant pale tipping of the guard hairs of the upperparts and the fringe of the tail.

The skin could pass in a series of Yukon specimens as falling much closer to the series available from that area than to any specimens of *E. dorsatum dorsatum*.



Yellow-haired specimen alongside a typical black-haired porcupine, dorsal view.

Although Anderson and Rand (1) have shown that both yellow-haired and black-haired specimens all of one species occur in the Yukon, their large series of eastern porcupines contained no yellow-haired specimens.

The present specimen appears, then, to be a yellow-haired eastern porcupine (*Erethizon dorsatum dorsatum*) and is, as far as can be ascertained, the first such specimen to be recorded.

¹ Received for publication November 14, 1946.

The accompanying photograph shows this yellow-haired eastern porcupine alongside a typical black-haired specimen which was collected at the same time. The yellow-haired specimen is No. 480 in the writer's mammal collection.

LITERATURE CITED

- (1) Anderson, R. M., and A. L. Rand, 1943. Variation in the Porcupine (Genus *Erethizon*) in Canada. Can. Jour. Res., vol. 21, pp. 292-309.

THE OCCURRENCE OF A COLUMNAR FORM OF THE WESTERN RED CEDAR ¹

By R. GLENDENNING,
Agassiz, B.C.

IN THE AUTUMN of 1945 the late Gordon Eddie of Sardis B.C. asked me to identify a group of conifers located at Kilgard, on the northern edge of Sumas prairie B.C.

It had previously been reported that the yellow cedar, *Chamaecyparis nootkatensis* (Lamb.) Spach here descended to the lowlands, and as this would be an unusual habitat for this Hudsonian zone tree, a visit was made to Kilgard.

The trees were readily located by Mr. J. W. Winson of Huntingdon and myself; their strikingly columnar form so different from any of the other native conifers. Our first impression was that someone had planted Lawson cypress or that this species had seeded itself promiscuously. However an examination of the cones showed them to be elongate and Thuja-like, and not globose as in *Cupressus* and *Chamaecyparis*.

Material was collected, and examination indicated that it was apparently a form of *Thuja plicata* Lamb. This determination was later confirmed by Mr. A. D. Cotton of Kew; Mr. A. Bruce Jackson to whom it was referred expressing the opinion that "it would go under the variety *fastigiata* Schneider". This variety incidentally appeared in a Yorkshire nursery about 1905, so can have no connection with the Kilgard trees, even if similar, which is not assured.

Subsequent visits made to the location at Kilgard showed that plants of this fastigate form occurred of all ages and sizes, from young seedlings up to large trees 150 feet high, probably several hundred years old, and from the numbers found it was evident that this columnar form was coming true from seed. No individuals of the typical

spreading form were found mixed with it, so it would appear that the habit is entirely fixed.

The original tree responsible for all this columnar progeny has not been definitely found, but in one clearing a very large stump occurs from which two suckers have grown; this may possibly be the primal parent.

As far as is known this fastigate variety is only found adjacent to the Kilgard brickworks, extending for about half a mile eastward along the base of Sumas mountain. North-eastward up the mountain slope it has been traced for nearly a mile alongside the wooded road to Straiton; after this the usual spreading form takes its place. The mountain slope is densely wooded with a mixture of Douglas fir, cedar, much alder, maple and willow, some spruce, hemlock and balsam, and is in fact the usual mixed forest flora found on cut-over lands; conifers and broad-leaved deciduous species fighting for supremacy and a place in the sun. As a result of this dense growth it is not easy to define exactly the limits of distribution of this columnar form.

The centre of the area occupied by these cedars occurs on an Indian reserve at the foot of the mountain where are some small partly cleared fields used for rough pasture. On these fields many young cedars have grown, standing up like fastigate yews in a cemetery. In fact it was hard to believe that they had not been planted, or that the strict habit was not due to animals browsing, but as the compactness continued far above the reach of horses it was realized that the habit was natural.

¹ Received for publication December 31, 1946.



Seedling columnar cedars (*Thuja plicata*) on Kilgard Reserve, B.C. Background of mixed forest and part of Sumas Mountain.

In the typical form of *Thuja plicata* the young trees are broadly triangular in outline, the branches widely spaced and the branchlets more or less pendent. In the Kilgard trees the outline is columnar in young trees, becoming narrowly triangular with age, and the branchlets are semi-erect and close set, forming a dense shaft of green foliage. Young trees 10 feet high are only 2 feet in diameter at the base when growing in the open, as can be seen in the illustration. Those growing in shade are rather more lax in habit but keep their columnar outline.

The growth habit responsible for the trees assuming this narrow compact form would seem to be the frequent division of the terminal bud of the individual branches, whereas in the type, extensive elongation takes place between branching.

This fastigate form undoubtedly arose long before the advent of Europeans in this country with their subsequent settlements and clearing, and has persisted for hundreds of years. From its occurrence both on

cleared land and in the dense forest it is apparently well able to withstand competition, and is a healthy, handsome and vigorous tree. However there is no doubt that the partial clearing of the forest, resulting from the domestication of the Indians, of the Kilgard reserve, has facilitated its spread, and incidentally led to its discovery.

How far it will spread and compete with the type is conjectural depending on the ultimate utilization of both the cleared land and the mountain forest. At the present time there is no fear of its becoming lost; its abundance, and the fact that nurserymen, realizing its ornamental value are propagating it, assures its continuance.

What the status of this tree should be in the flora of the Province is an interesting question. The tree has marked individuality, sustained through many generations. It definitely comes completely true from seed as no specimens of the type occur mixed with it. In view of this should it have specific rank or still be considered only a form of *T. plicata*?

NOTES AND OBSERVATIONS

Turkey Vulture in Cape Breton Island, N.S.

— On October 12, 1946, I saw a turkey vulture west of Bucklaw, in neighbouring Inverness Co. The bird was gliding southwest from Bucklaw Mountain and across Narrows Pond. It was under observation for some minutes, and a good view was obtained through binoculars as it passed, at close range, where I was standing on the road. It was nearly the size of the bald eagle, which is quite numerous in this area, but its head was much smaller; its tail was much slimmer; the wings were dark black forward and lighter black posteriorly. The bird hardly flapped once during the minute or two it was in view.

The turkey vulture is a rare bird in the Maritime Provinces, and this seems to be the second record for Cape Breton Island, having been recorded formerly by R. W. Tufts (1927; Can. Field-Nat. 41, p. 65). — E. V. GOODWILL, Ottawa.

Stomach Stone in a Muskrat. — Through the kind offices of Mr. J. Dewey Soper, the National Museum received from Mr. Sam Waller of The Pas, Manitoba, a stomach stone from a muskrat (*Ondatra zibethica*). The muskrat was trapped about March 20, 1947, on Swanee Lake (probably near The Pas) and the stone is said to have been found in the stomach.

The stone is smoothly curved, nearly spherical, measuring 16.5 mm. by 18.5 mm. in size, surface uniformly rough, colour pale yellowish olive. Where the surface was scraped the material shows a fine grain with a medium gloss and a rather brighter very pale olive yellow colour as compared with the untouched surface.

Sawn in half the cross section presents a solid, close-grained surface, apparently uniform in hardness and scratched fairly easily with a steel point. The stone is apparently built up of a series of concentric layers. In the center is a green dot about one and a half millimetres across. The central section 10 mm. in diameter is of layers of pale green of various shades; the outer layers are whitish and the surface layer greenish.

Pieces of the stone treated with hydrochloric acid effervesced rapidly and largely disappeared indicating the presence of considerable calcium carbonate. A few small, flexible flakes of what appeared to be fibrous

material were left in the acid; probably they were of vegetable origin.

Hard masses of various kinds have been found in the stomachs and intestines of many mammals but calcareous masses are usually found only in herbivores (Adami, 1912; "Principles of Pathology", Vol. 1. p. 874). Some such masses, which are fibrous and absorptive, have been known as "madstones" and superstition had it that they were of curative value if applied to the bite of a mad dog (Bryant, 1924, Jour. Mammal., 5, pp. 200-201).

They are largely composed of ammonio-magnesium phosphate and lime salts. (Bryant, l. c.) Veterinary research has indicated that contributory factors may include lack of vitamin A, insufficient water intake due to a wet diet (animals on a dry diet drink much more water), and a suitable nucleus in the stomach, such as animal or vegetable hairs or some indigestible object like a nail or a pebble. In the latter connection it is noteworthy that concretions introduced experimentally into animals may continue to grow even though the animal receives a normal diet. On the other hand concretions may not form in animals receiving an excessive mineral diet, in the absence of a suitable nucleus (Newsom, 1938, Jour. Am. Vet. Med. Ass., 45, p. 495).

Lichtwitz (1944, in J. Alexander's "Colloid Chemistry, Theoretical and Applied", Vol. V) suggests that concretions of the concentric type are formed by a Liesegang process involving the alternating deposition of a protein component and an encrusting material.

These stomach concretions seem to cause the animals no ill effects as contrasted with renal concretions (kidney and bladder stones) which may be very rapidly fatal. — A. L. RAND and P. A. ORKIN, National Museum of Canada, Ottawa.

Juvenile Skunks. — While it is well known that most young mammals suckle at the same teat, little is known as to what, if any, order is maintained by the young when on safari with the mother. Young skunks usually, if not invariably, follow the mother in single file. The opportunity to observe something of the order followed occurs so rarely that it is worth reporting a case where one of the young could be definitely identified. In

September, 1939, Theodore E. Howard told the writer that he was staying with Jerry Nunn at Harperville, a village between St. Laurent and Woodlands in Manitoba. Several times he and Nunn saw a mother skunk and her family of five out for a walk. Every time, number 4 of the young skunks, which could be identified by its being lame, was in its fourth place in the line.

This raises several questions. Is it part of the same dominance that accounts for the original choice of individual teats in feeding? Has the order of choice of teats any numerical connection with the choice of position in travelling? Is a definite position regularly assumed when the young are later on feeding upon carrion or other food? Is there any connection between the actual order of birth and the places assumed when feeding and travelling? Certain other members of the weasel family travel in line ahead, at least sometimes, so perhaps valuable information could be supplied by breeders of mink, fisher, etc., along these lines. — L. T. S. NORRIS-ELYE, Winnipeg, Man.

Hooded Warbler in Quebec. — On May 3, 1947, I saw a Hooded Warbler (*Wilsonia citrina*) at Baie d'Urfee, east of Ste. Anne de Bellevue, P.Q. As it flitted from twig to twig of the low saplings above the floodwaters of the Ottawa River, the bird was carefully observed to be a warbler of generally yellow coloration with a black crown which continued behind the neck and met a black collar. The eye was within the yellow patch, enclosed by the black hood. On the following day, a Hooded Warbler, apparently the same individual, was seen in the same *locale* by Mrs. Isabel Zagallo, of Portugal, a guest; Mr. W. E. Whitehead, Lecturer in Entomology at Macdonald College; Mrs. Gray; and myself.

I know of no other recorded instance of the occurrence of the Hooded Warbler in the province of Quebec. — P. H. H. GRAY, Macdonald College, Quebec.

Cerulean Warbler (*Dendroica cerulea*) at Ottawa. — On May 24, 1947, a male of this species was seen in the woods beside the Rideau River in Lot 20, R.G., Gloucester Township, Carleton County. It was watched at close range for several minutes through a pair of Ross 7x50 binoculars as it fed in the underbrush, then just breaking into leaf. The bird was compared on the spot with the illustration and text in Peterson's "A Field

Guide to the Birds". It was blue above with two white wing-bars, and white below with a narrow black line across the upper breast. This black line was clearly seen and made the bird unmistakable. In addition two bluish warblers with which it might have been confused were also seen earlier the same day, a parula warbler and a male black-throated blue warbler, the latter at the same place. This is the second record of the cerulean warbler for the Ottawa area. — E. V. GOODWILL, Ottawa.

An Instance of Killer Whales Feeding on Ducks. — While watching a half-dozen killer whales that were travelling along our rocky shoreline, at Triple Island, British Columbia, in January, 1946, my wife and I noted that they were feeding on ducks, mostly white-winged scoters, which they successfully chased and caught.

A whale would spot a duck and start after it, the duck taking flight when it saw the large dorsal fin approaching. The ducks were unable to gain altitude quickly enough and were snapped up while they were flying, their wings still pattering on the water as they tried to escape. Approximately a dozen ducks were taken in this manner in a very short time, after which the others took off. The whales left soon afterward, probably in search of more ducks. We noted that it was necessary for the whales to turn on their backs in order to seize the ducks. — GORDON C. ODLUM, Triple Island Lightstation, Prince Rupert, B.C.

Summer flocking of the loon, *Gavia immer* (Brun.). — In winter loons are sometimes seen in large gatherings which can hardly be called flocks, numbering from 40 to 100 birds, but are more usually seen singly or in small parties (Bent, 1919, U.S. Nat. Mus., Bull. 107, p. 58). In spring migration, from early April to early May it is common to see loons in flocks sometimes containing as many as 40 individuals on Okanagan Lake in British Columbia. (Munro, 1945, Auk, 62, pp. 38-49). But during the breeding season, from May to August and September it is believed each pair remains on a territory it has established, and does most of its feeding there. Occasional intruders into these territories are resented with more or less vigor. These intruders, single birds, pairs, or small parties, apparently in search of food, are considered to be non-breeders.



Part of a flock of loons (*Gavia immer*) on File Lake, Manitoba, June 24, 1946. The whole flock numbered over 100 birds. Photograph by Dr. J. M. Harrison.

Recently Dr. J. M. Harrison of Ottawa, communicated verbally some interesting notes on summer flocking of loons in their breeding range. Dr. Harrison's work in recent summers has been in the Flin Flon area of central western Manitoba. This is Precambrian country, dotted with many small lakes and a few larger ones. Loons nest commonly through the area; usually a pair has a wide area about its nest exclusively for itself. But on two large clear lakes in which the fishing is especially good, Dr. Harrison has seen loons congregate in large flocks in July 1943, and June and July 1946. The lakes are Lake Athapapaskow 8 miles east of Flin Flon and File Lake, about 50 miles east of Flin Flon. He has seen congregations of up to 60 birds on the former and of more than 100 birds on the latter. The loons were seen flying to the lakes in the early morning; during the day the size of the flock increased, until about 3 P.M. when the maximum number of birds was present, after which the birds began to leave the lakes. Apparently only the few local nesting birds spent the night on the lakes. There seemed to be little coming and going during the day, and no signs of the loons carrying fish from the lakes were seen; the birds appeared to come to feed.

Though a number of pairs of loons were nesting on these lakes (the earliest date on which young were noted in 1946 was on June 19) no aggressive behavior was seen.

This behavior suggests several things: that the adults may congregate at good fishing places to get food for the young, though against this is the fact that no food was seen to be carried; that these are non-breeding birds, such as Munro mentions, that congregate to feed, though if this were the case one wonders why they would leave the lake; or it may be that one or the other of a pair with young may leave them for part of the day.—A. L. RAND, National Museum of Canada, Ottawa.

First New Brunswick Specimen of the Northeastern Long-tailed Ermine (*Mustela frenata occisor* (Bangs)). — Early in 1947 the writer was given the flat stretched skin and the skull of a weasel which had been trapped in the basement of a house at Nashwaaksis, N.B. (just outside Fredericton) in late November 1946. At about the same time the manuscript of a forthcoming paper by Dr. R. F. Morris (1) was read. From this paper it appeared that the animal was probably *M. f. occisor*, although Morris states that the species “—probably occurs but is much less common than the Bonaparte Weasel”. Morris also states that “In 1873 Adams described two species of weasels in New Brunswick and his measurements indicate that one was the Bonaparte Weasel and the other the Long-tailed Weasel”; and also that “In 1896 Cox also recorded the latter species from Sunbury County—”.

The skin and skull of the present specimen were sent to Dr. A. L. Rand of the National Museum of Canada, Ottawa, for identification; the determination received was *Mustela frenata occisor* (Bangs). Dr. Rand's notes on the specimen are as follows: "Length, stretched skin, 474 mm.; skin on tail, 130 mm.; black brush or pencil, over all 75 mm.; main part, 50 mm.; black pencil has a few long straggling hairs in tip, which grades into the white of the rest of the tail. The skull is moderately old, with a moderate sagittal crest, and the greatest length of 51 mm.; and mastoid breadth of 23.5 mm.". The animal was a male. Dr. Rand referred the specimen to *M. f. occisor* on the basis of the long black pencil compared with southern Ontario specimens.

This specimen (which is No. 496 in the Brown Collection) is apparently the first for New Brunswick and is the second Canadian specimen. Anderson (2) records a specimen from Kamouraska, Kamouraska County, P.Q., taken by W. Labrie on December 7, 1943.

The writer is indebted to Mr. Lloyd Bailey from whom the skin and skull were obtained, to Dr. Rand for the determination of the specimen and to Dr. Morris for permission to refer to his unpublished paper.

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- (2) Anderson, R. M., 1946 — Catalogue of Canadian Recent Mammals. Nat. Mus. of Canada, Bull. No. 102, Biol. Ser. No. 31.

— N. R. BROWN, Faculty of Forestry, University of New Brunswick, Fredericton, N.B.

Sharp-tailed Grouse again abundant at Athabaska Delta. — A few years ago sharp-tailed grouse (*Pedioecetes phasianellus*) were very scarce in the Athabasca Delta area (see Soper, 1942, Trans. Roy. Can. Inst., 24, Pt. 1., pp. 47-48).

In the spring of 1946 they had increased in numbers, and were quite numerous. In the fall, just after freeze-up, flocks of from 50 to 200 birds were seen. On October 28, between 3 and 4 P.M., immediately north of Fort Chipewyan, between 2 and 3 thousand birds were seen, made up of about twenty different flocks; these birds were flying north-west, possibly going to their roosting grounds for the night. — ANGUS GAVIN, Fort Chipewyan, Alberta.

BOOK REVIEWS

AN INSECT BOOK FOR THE POCKET. By Edmund Sanders: 349 pages; 37 pages of coloured illustrations; many text figures. Oxford University Press, Toronto, price \$3.75.

This pocket-sized book, dedicated to the memory of Jean Henri Fabre (1823-1915) is excellently produced and full of useful knowledge. It is a discussion of the families of insects occurring in the British Isles, members of which exceed half an inch in length of body or one inch in wing-expanse. About 130 families are included. The characters of most families are given as well as information regarding habits and life-histories. In addition to discussions of the Orders of Insects, data are presented regarding arachnids, myriopods and crustacea. A bibliography includes a selected list of publications to which the reader is referred for fuller information.

Although the book is primarily for students resident in the British Isles, the data it contains will be found of value to entomologists

and others in Canada and elsewhere. The coloured illustrations are very good and should be of help in identifying the various families and in many cases the actual species.

Like other similar books published by the Oxford University Press, it is well printed, and should have a ready sale.

Unfortunately the author died on September 19, 1942, not living to see the result of his labours in print. — ARTHUR GIBSON.

SOME CANADIAN FUR BEARERS. By A. L. Rand, National Museum of Canada, Special Contribution No. 46-1, Department of Mines and Resources, Ottawa, 1946; pp. 20; price .10c.

This booklet contains a brief description of each of the Canadian fur-bearers, together with an excellent figure. It will fill the needs of schools and Government offices for an authoritative pamphlet on fur-bearing animals as nothing previously available has ever done. — C. H. D. CLARKE.

THE BIRDS OF BREWERY CREEK. By *The Right Honourable Malcolm Macdonald*. Oxford University Press, 1947, pp. 334 with 23 full-page illustrations, 7 in colour, from photographs by Dr. Arthur A. Allen and W. V. Crich, F.R.P.S. (\$3.50).

During five years' residence in Canada as High Commissioner for the United Kingdom, Mr. Macdonald wrote two books. With his first, "Down North" he proved himself to be a keen observer and an entertaining author. With his second, "The Birds of Brewery Creek" he goes on to show that he is an extremely capable ornithologist.

As High Commissioner during the arduous war years, and those immediately following, Mr. Macdonald obtained needed relaxation in bird watching. Several times a week, usually in the early mornings, he crossed the Ottawa River to the mouth of Brewery Creek. These periods of recess were not spent in idle observation. Notebook and pen were in constant use. In a year and a half, 160 species of birds were recorded in the little study area.

The published result is not merely an account of the birds he saw. Anyone could have produced a dry, annotated list. It is a fascinating pageant of the seasons, through which the various avian characters appear and re-appear, contending with the series of crises which have to be met as the yearly cycle rolls on.

The delightful interpretation of the courtship antics of the cowbirds, "The loohest and most disreputable characters in Canadian bird society"; an interesting theory to explain the "broken-wing" behaviour of the killdeer; original observations on the display of the spotted sandpiper; the mystery of the case of the three young phoebes; the story of the flickers' moustaches, which deserves much re-telling; these sections and many others mark the book as one to refresh the ornithologist, to indicate avenues open for study, to entice many newcomers into the enchanting hobby of bird watching.

Mr. Macdonald includes a great deal of information on the life histories of many resident birds such as redwing, yellow warbler, Baltimore oriole, Savannah sparrow and flicker. Certain aspects of ecology and phenology are of considerable value. The illustrations are among the best and are chosen to fit the text. References are presented mostly in the form of footnotes. An

excellent subject index adds to the usefulness of the book. — O. H. HEWITT.

SILENT WINGS. By *Aldo Leopold*, A. W. Schorger, and H. H. T. Jackson; edited by *Walter E. Scott*, pp. 1-42, figs. 1-11, 2 plates, frontispiece (col.), Wisconsin Society for Ornithology, Madison, Wisc., May, 1947, \$1.00.

In 1847, when Benedict Revoil marvelled at uncountable, sky-darkening numbers of passenger pigeons, even shivered in the chilling draught set in motion by the sweep of a million birds across the sky, there seemed no end to the numbers of this species. Exactly a century later, however, on May 11, 1947, at Wyalusing State Park, Wisconsin, a monument was unveiled to the passenger pigeon, an extinct species, long since gone irrevocably and forever "through the avarice and thoughtlessness of man"! *Silent Wings*, a memorial to the passenger pigeon, was published on the occasion of the unveiling of this monument.

This booklet assembles a surprising amount of information. There is a poignant tribute to the passenger pigeon, by Leopold; an account of its Wisconsin history which includes also valuable general information on its nesting, food habits, flight speed, etc.; a timely address on attitude in conservation, by Jackson; and a reprint of Schorger's vivid, extremely well-documented article on the great Wisconsin nesting of 1871. There are reproductions of eight photographs of the bird in captivity which show the nest, egg, young, and adult; of William Pope's 1835 painting of the adult male (coloured frontispiece); and of several other drawings, etchings, and paintings of especial interest which, combined with the text, make up an attractive and authoritative document on the decline and passing of what was perhaps North America's most spectacular species. — W. EARL GODFREY.

Morris, R. F., 1945. *On Skunks and how to remove them.* *Acadian Naturalist*, 2, No. 5, pp. 34-39. Recommends removal of skunks that are objectional about buildings by capturing them in box traps and releasing them elsewhere. Removed as short a distance as 2.5 miles they did not return. A diagram of a suitable box trap is given. — A. L. RAND.

Clay, J. O., 1946. *Western Willet, seen at Victoria, British Columbia.* *Murrelet*, 27, No. 1, p. 13. On April 29, 1945, 3 bands of 8, 25 and 17 seen. — A. L. RAND.

Kendeigh, S. Charles. **Bird Population Studies in the Coniferous Forest Biome during a Spruce Budworm Outbreak.** Department of Lands and Forests, Ontario, Canada, Div. of Res. Biol. Bull. No. 1, 100 pp., 1947.

Working with study plots in Ontario, the density of all bird species totaled 319+ pairs per hundred acre; this was an extraordinarily high breeding population for a forested area, especially a coniferous one. It was probably due to the outbreak of spruce budworm and some data is given that similar increases have taken place when earlier outbreaks occurred. The insecticide D.D.T. in an oil spray applied by plane at the rate of 1 pound per acre, produced a small, apparently negligible, immediate mortality. Territories were mapped and measured for many species, and food, methods of feeding and territory defense were studied. The forest population included 10 species of wood warblers. Geographical variations in song are recorded for two species. Clear cut distinctions between habitats were not found, differing from the author's previous findings with this group elsewhere. There was considerable competition between species, as well as within species, for territory. It is suggested that as well as a great increase in population due to abundant food, certain warblers such as the bay-breasted, Tennessee, and Cape May, increase at the expense of some other species.

The ability of many species of birds to increase with an increased food supply, as illustrated here, is interesting in view of the oft quoted (and perhaps erroneous) belief that each pair of birds produces just enough progeny to replace itself. May there not be extra, surplus, progeny, that does not ordinarily breed, but under certain conditions may do so? Kendeigh holds that in forest species the competition for territories may limit the density of population.

The discussion as to the origin and segregation of habitat differentiation between closely related species is short.

Kendeigh holds that many species, not highly specialized, would spread out and invade other ecological niches if it were not for interspecific competition, but goes on to say that in some species the habitat preference is inherited, and its purpose is to eliminate unnecessary competition between species. Lack's views are criticized, but perhaps one of the big differences between their conclusions is due to their approach; Lack's is from

an evolutionary viewpoint — how did these differences arise; Kendeigh's is — what purpose do these differences now serve. In any case, the present study presents an unusual situation, with closely related species living in the same habitat, perhaps due to abnormal conditions. But even here we have some species succeeding at the expense of others. A similar study of the same area under normal conditions would be interesting.—A. L. RAND.

Friedmann, Herbert. 1946. **The Birds of Middle and North America.** *United States National Museum, Bull. 50, part 10, 484 pp.*

This is the tenth part of the well known work commenced by the late Robert Ridgway and continued by Dr. Friedmann. The present volume covers the gallinaceous birds. This series is one of the indispensable tools of anyone working in the taxonomy of Canadian birds. The extensive references, the careful diagnosis of groups from orders to subspecies, and the ranges are models of careful work. Ornithological workers generally will be grateful to Dr. Friedmann for his capable work, and will be looking forward to the completion of the series. — A. L. RAND.

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OTTAWA, CANADA, MARCH-APRIL, 1948

No. 2

OBSERVATIONS ON THE BIRDS OF RENFREW COUNTY, ONTARIO ¹

By HOYES LLOYD AND ROBERT G. LANNING,
Ottawa and Toronto.

RENFREW County² lies southwest of the Ottawa River. The Town of Arnprior is at its extreme eastern point and is about 32 miles due west of the City of Ottawa. The maximum length of the County, along Ottawa River, is approximately 115 miles, and the maximum width, near the south border, is approximately 60 miles. It is irregular in shape with a 'panhandle' about 50 miles long in the northwestern part lying between the Ottawa River and Algonquin Park. The area is more than 3,000 square miles. It is bounded by Ottawa River on the northeast; on the south by the counties of Lanark, Frontenac, and Lennox and Addington; on the west by Hastings County and Nipissing District.

The area is drained by turbulent streams tributary to the Ottawa. The main ones, named in order from south to north, are: Madawaska, Bonnechere, Snake-Muskrat, Indian, Petawawa, and Chalk Rivers." . . .

"The topography of the area is varied but can be classed as: (1) the low, comparatively level, eastern part, and (2) a rocky upland, western part. The lowland comprises the Ottawa valley and the lower parts of the valleys of the main tributaries. There are, however, isolated basins within the upland area and groups of low, rocky hills out in the lowland. Near the western limits of the lowland the rock cover is sand, and the soil is poor. Most of the basins within the upland area are also filled by sand rather than clay. Generally speaking, the lowland area has a deep soil with few rock exposures and the upland has a thin soil with many exposures."

The same author tells us that the lowlands of the Ottawa River and tributaries such as the Bonnechere are covered with clay depo-

sited well out from shore in the post-glacial Champlain Sea, while the shoreline deposits of this sea are now the extensive sand-plains of the upper parts of the valleys as at Combermere.

Mink Lake is a marly lake in the north-central part of the county, lying northeast of Eganville about three miles. It is surrounded by about equal parts of farm land and woods.

Golden Lake is also in the north-central part of the county, an enlargement of the Bonnechere River. The surrounding country is occupied one third by farming and two thirds by second growth pine and hardwood forest. Much of the pine in the vicinity is of uniform age, — perhaps 70 years, thus dating back to early clearing fires following first regular settlement.

Combermere is in the westerly part of the county on the Madawaska River. Here high hills surround the valleys which are level and sandy. The area is largely forested, the hills almost entirely so.

The county is noted as the source of much of the early pine timber of the Ottawa valley³ and has certainly altered greatly in the past one hundred years.

The Ottawa River at Arnprior has an elevation above mean sea level varying from a high of 246 feet to a low of 239.6; at Pembroke, 374-365.3; and at Chalk River, 477-471. The elevation of Golden Lake is 553 (Sept. 19, 1913); Calabogie Lake, 505-500; Lake Kaministiquia (Oct. 2, 1900) 927; Madawaska River at Madawaska, 1031; Railway summit near Wilno, 1021.⁴

Recent hydro-electric power developments have changed some of these levels and will

¹) Received for publication August 13, 1946.

²) Mineral Deposits in Renfrew County and Vicinity. B. C. Freeman, Geological Survey Memoir 195, 1936.

³) The Forest Resources of Ontario, J. F. Sharpe and J. A. Brodie, Ontario Dept. of Lands and Forests, 1930.

⁴) Altitudes in the Dominion of Canada: second edition, 1915, James White. The Mortimer Co., Ltd., Ottawa.

possibly cause alteration in bird life, particularly in the Madawaska Valley.

The Ontario Hydro-Electric Commission built an enormous dam at the foot of Calabogie Lake and installed a large power plant there. In order to insure a continuous head of water, small dams were built at several places and a very large dam was constructed at the foot of Bark Lake. This dam raised the level of Bark Lake thirty-five feet and flooded up river about fifty miles. The drowned area (which included most of the previous site of the town of Madawaska) is of considerable extent and as yet the effect on bird life is hard to ascertain, for although previous marshland has been flooded, new marsh may result, but possibly miles of desolation and waste may be caused.

The dam at Palmer Rapids raised the water level on the Madawaska River at Combermere about four feet and the resultant effect has been noted over several years. Species which were noted to be especially harmed were solitary sandpiper, northern water-thrush, and bittern; the former two being displaced by the flooding of mud flats along the river bank and the latter by flooding of beaver meadows.

Where the York Branch joins the Madawaska just above the dam at Palmer Rapids a tremendous marsh exists which extends about twelve miles up the York branch and is about a mile wide. There is an abundance of wild rice and other marsh vegetation and the area seems a suitable wild-fowl habitat. Originally the marsh consisted only of wet beaver meadows on each side of the channel. About 1920 a company organized with the object of establishing a muskrat farm on this marsh built several small dams and managed to flood part of the beaver meadows. Although their dams were later damaged by local residents and the enterprise discontinued much of the marsh remained flooded with several feet of water. This made an excellent habitat for shorebirds and wild-fowl to such an extent that Townson (Rod and Gun Vol. 27, No. 4, 1926) described the area as being one of the best in southern Ontario for these birds. The existence of this marsh attracted many birds and resulted in such unusual records as occurrence of American egret and breeding of ring-necked duck.

The Palmer Rapids dam then further raised the height of water in the marsh so

that there was about four feet of water over most of it with channels about twelve feet in depth through which a strong current flows.

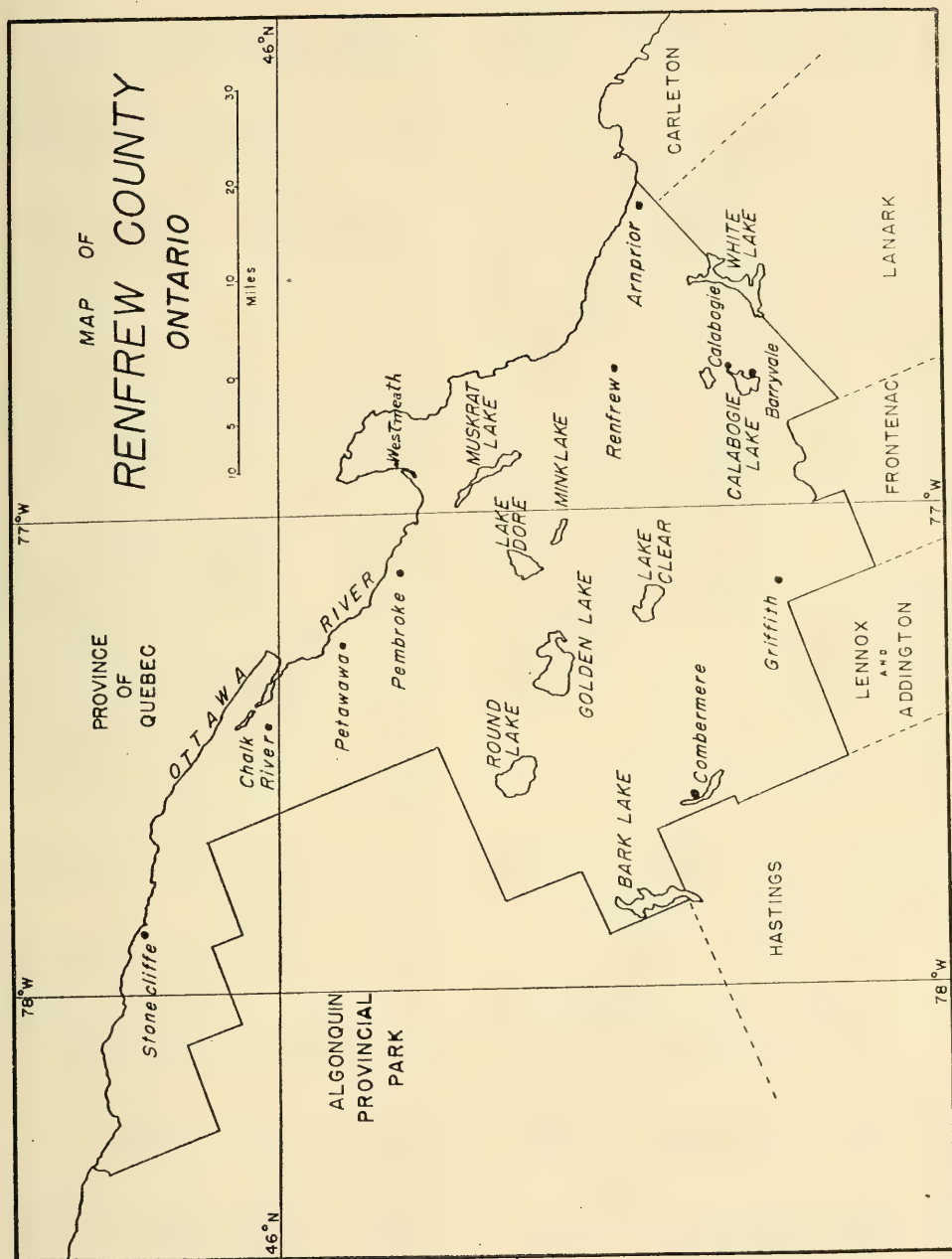
In 1943 another addition was made to the Palmer Dam and this raised the water about three feet thus further flooding the marsh. As yet it is hard to foresee the results of this flooding on wild-fowl and their necessary food plants; however, it has removed much suitable shorebird habitat the equivalent of which may or may not be found elsewhere in the marsh.

Lanning has observed bird life at Combermere on the Madawaska River during several summers as follows:

1940 — June 28-September 3 and October 13, 14; 1941 — June 28-September 1; 1942 — June 30-September 8; 1943 — July 10-September 2; 1944 — July 10-17, July 22-August 22.

Lloyd has spent time at Mink Lake, near Douglas, in connection with natural history instruction at the camp conducted by the Ottawa Boys' Club; and at Golden Lake, giving similar instruction to boys at the camp operated by the Ottawa Y.M.C.A. Mink Lake visits were as follows: August 9-12, 1924; August 1-4, 1925; July 31-August 3, 1926; July 22-26, 1927; July 14-17, 1928; July 8-11, 1929; July 14-17, 1930. Golden Lake visits have been as follows: June 26-July 5, 1924; July 16-22, 1925; August 3-8, 1926; July 18-22, 1927; July 17-21, 1928; July 11-14, 1929; July 10-14, 1930; July 3-8 and July 23-August 4, 1944. On the latter day Lloyd went by motor car to Combermere where he remained with Lanning until August 7 and then both drove across the county towards Ottawa, stopping en route at Golden Lake. In 1945 Lloyd's Golden Lake visit was from July 4-14, and July 24-August 3.

Thanks are due to the following for permission to include observations and records made in Renfrew County: A. E. Bourguignon, A. Cringnan, J. A. Crosby, R. Y. Edwards and O. H. Hewitt. Also N. R. Brown, who visited the Y.M.C.A. Camp On-Da-Da-Waks, at Golden Lake, as guest instructor on forest insects for the period July 24-29 inclusive, 1939, and July 15-18 inclusive, 1940, has kindly furnished us with a list of his bird records for those days with permission to use them here. In many cases Mr. Brown's observations confirm other Golden Lake data, and are not specifically mentioned, but in others, add valuable new details which are herein given



in full. E. F. G. White has given us, from memory, an account of the birds he found within approximately five miles of Westmeath while hunting there in company with A. W. Throop. Their visits took place in the period of about twenty-five years from 1914 to 1939.

ANNOTATED LIST OF BIRDS

1. *Gavia immer immer* (Brünnich).

COMMON LOON. Common all summer at Combermere, breeds. Adults with young were seen at Killaloe, July 16, 1941, and at Combermere, July 8, 1942. Loons were found on almost all lakes visited and usually they were in flocks of four by August, so it would seem that this species nests commonly throughout the area. In late August there is much commotion as the young are trying out their new flight feathers and flying about in flocks. On July 23, 1943, four fully adult birds were watched for about a half hour as they went through a very complicated set of dances. One or two individuals were noted every year at Golden Lake, and about the same number at Mink Lake, except that there is no record of any seen during the 1930 visit to the latter lake. White reports a few at Westmeath.

2. *Colymbus auritus* Linnaeus.

HORNED GREBE. A few are found in October at Westmeath (White).

3. *Podilymbus podiceps podiceps* (Linnaeus).

PIED-BILLED GREBE. Uncommon summer resident at Combermere, breeds. On July 22, 1940, an adult with five young was seen, and between June 28, 1941, and July 20, 1941, a family group was noted several times on the marsh of the York Branch of the Madawaska River. This species is far from abundant, the above two families being the only ones found. This may be partly due to the fact that suitable nesting territory is now widespread. White noted it at Westmeath and says it bred there.

4. *Ardea herodias herodias* Linnaeus.

GREAT BLUE HERON. Common summer resident at Combermere, breeds. A nest with three young was found there on July 16, 1941. Found throughout the Combermere area and a large heronry must exist although Lanning could find no clue as to its whereabouts.

Seen in small numbers most years at Golden and Mink Lakes, possibly birds from colonies which have been reported in this general

vicinity. A few have been noted at Westmeath by White.

5. *Casmerodius albus egretta* (Gmelin).

AMERICAN EGRET. Accidental, one seen by Lanning on July 19, 1943, at Combermere marsh; black legs and yellow bill noted. There is a Renfrew County specimen in the National Museum of Canada. (cf. Can. Field-Nat. 58: 146. 1944).

6. *Butorides virescens virescens* (Linnaeus).

EASTERN GREEN HERON. Lanning saw one at Combermere on July 15, 1940, the only one noted. It was observed for some time at close range as it stood on a log in a small marsh.

7. *Nycticorax nycticorax hoactli* (Gmelin).

BLACK-CROWNED NIGHT HERON. Noted at Golden Lake August 2 and 3, 1944, and on July 6, 1945.

8. *Botaurus lentiginosus* (Montagu).

AMERICAN BITTERN. Common at Combermere from 1940 to 1943, rare in 1944, possibly because of high water, which made most marshes much too wet to afford suitable habitat. One seen at Golden Lake, August 5 and 6, 1926; another noted August 4, 1944, (Golden Lake to Combermere). E. G. White reports it as common and breeding at Westmeath.

9. *Ixobrychus exilis exilis* (Gmelin).

EASTERN LEAST BITTERN. One noted by White at Westmeath.

10. *Cygnus columbianus* (Ord).

WHISTLING SWAN. On one occasion a small flock remained in the Bay at Westmeath and on the sandbars of the Ottawa River for several days where they were seen by Throop and White. Since then Mr. Proulx and H. Bedard (fall 1941) have seen single birds there.

11. *Branta canadensis canadensis* (Linnaeus).

COMMON CANADA GOOSE. Jos. Perrier mentioned shooting a heavy old gander in his pasture near Combermere in the fall many years ago. He said that it was exhausted when it alighted, and that about ten others were taken at the same time. Bourguignon reports that this is an abundant migrant in the vicinity of Westmeath, especially in the fall, from about September 15 to November 15. In the spring they rest on the ice of the Ottawa River. A specimen in his collection was taken in the fall of 1940.

White also reports this species as common at Westmeath.

12. *Chen hyperborea* subsp.?

SNOW GOOSE. A flock of snow geese was seen at Westmeath by J. D. Roberts and Throop.

13. *Chen caerulescens* (Linnaeus).

BLUE GOOSE. Bourguignon saw one at Westmeath in the fall of 1940.

14. *Anas platyrhynchos platyrhynchos* Linnaeus.

COMMON MALLARD. A few at Westmeath (White).

15. *Anas rubripes* Brewster.

BLACK DUCK. Found nesting commonly all summer at the marsh near Combermere. A young specimen in Lanning's collection, showing some down, taken on July 28, 1944, was almost full grown except for the wings. It was one of four found on land 250 feet from water in a blueberry-bracken-sweet fern plain. About thirty-five were observed at Combermere on August 4, 1944, and a specimen was taken. Not common at Golden or Mink Lakes, but occasional birds seen there some years. Very common at Westmeath, occurring in large flocks on the river (White).

16. *Mareca americana* (Gmelin).

BALDPATE. A few noted at Westmeath by White.

17. *Anas acuta tztzihoa* Vieillot.

AMERICAN PINTAIL. A few at Westmeath. White.

18. *Anas carolinensis* Gmelin.

GREEN-WINGED TEAL. Common at Westmeath. White.

19. *Anas discors* Linnaeus.

BLUE-WINGED TEAL. Occurs at the marsh, near Combermere, and breeds there, but is far from common. One was seen on July 29, 1941, and an adult male and three young were seen on August 9, 1942. A male on August 19, 1944, was in full plumage; rather unusual, as it normally should have been in eclipse plumage at that date. White reports that is common and breeds at Westmeath.

20. *Aix sponsa* (Linnaeus).

WOOD DUCK. Uncommon: breeds on the Madawaska River at Combermere. An adult and five young were noticed from July 9 to 28, 1941. A male in partial eclipse was seen on

September 7, 1942. White reports it as common and breeding at Westmeath.

21. *Aythya americana* (Eyton).

REDHEAD. A specimen in the Lloyd collection was taken at Westmeath by E. G. White in October, 1923. White states that a few are found in some years and that one specimen in the National Museum was taken there.

22. *Aythya collaris* (Donovan).

RING-NECKED DUCK. Common migrant; breeds at the marsh, Combermere. On July 15, 1943, J. A. Crosby and Lanning saw a male and female there. On August 8 and 27 a female was identified by Lanning, and on August 29 he noted two females and three males. In 1944 on August 7, Lanning and Lloyd found seven adults and three small ducklings on the marsh in one group and an adult specimen was taken. About twenty-five ring-necks were identified on the marsh that day. On August 12, 1944, there were at least 35 birds of this species on the marsh, including a brood of five young.

A specimen in the Lloyd collection was taken by E. F. G. White at Westmeath on October 20, 1921. He states that they were often there on the opening day, and flocks came generally with the lesser scaups. He feels sure that the early ones were local breeders, but thinks that they may have come from Combermere.

23. *Aythya valisineria* (Wilson).

CANVAS-BACK. According to White a few are found at Westmeath in some years.

24. *Aythya marila nearectica* (Stejneger).

GREATER SCAUP DUCK. A fairly common species at Westmeath (White).

25. *Aythya affinis* (Eyton).

LESSER SCAUP DUCK. White records this as common at Westmeath.

26. *Glaucionetta clangula americana* (Bonaparte).

AMERICAN GOLDEN-EYE. Breeds commonly at Combermere where an adult and ten young were seen on July 12, 1942. Every year four or five broods are found along fifteen miles of the Madawaska River. White states that it is common and breeds at Westmeath. (See hooded merganser for account of female golden-eye accompanied by young hooded mergansers).

27. *Glaucionetta albeola* (Linnaeus).

BUFFLE-HEAD. White records a few as found at Westmeath.

28. *Somateria spectabilis* (Linnaeus).

KING EIDER. In one season only, several were shot at Westmeath by W. L. Cameron, A. W. Throop, and E. F. G. White.

29. *Melanitta fusca deglandi* (Bonaparte).

WHITE-WINGED SCOTER. A few were found at Westmeath in some seasons according to White.

30. *Melanitta perspicillata* (Linnaeus).

SURF SCOTER. A few in some seasons at Westmeath (White).

31. *Oidemia nigra americana* Swainson.

AMERICAN SCOTER. Four males were seen at Combermere on August 25, 1943, in characteristic black plumage.

32. *Lophodytes cucullatus* (Linnaeus).

HOODED MERGANSER. Breeds at Combermere, where J. A. Crosby and Lanning found a female with two young on July 21 and 22, 1943. Also noted at Combermere by Lanning and Lloyd, August 3, 1944, when three young were found with a female American golden-eye. This is either a case of adoption or parasitism caused by a merganser laying its eggs in a golden-eye's nest, both birds being tree-nesting species.

Two birds of the year were seen at Golden Lake on August 3, 1944.

Two specimens in the Lloyd collection were taken at Westmeath by A. W. Throop, November 7, 1923. White reports it as fairly common there.

33. *Mergus merganser americanus* Cassin.

AMERICAN MERGANSER. Breeds at Combermere. Between August 7 and 14 fifteen females with flightless young were found. Adults and young were also noticed from July 6 to August 18, 1941, and on July 9, 1942, seventeen young and adults were recorded.

It is of interest to note that when family groups of birds foraged once around a wharf or other protection for small fish they completely wiped out the fish population. It would appear that they are a serious predator of young game fish. (Lanning).

Eight were seen by Hewitt at Muskrat Lake, Cobden, November 26, 1945. White reports it fairly common at Westmeath.

34. *Mergus serrator* Linnaeus.

RED-BREADED MERGANSER. A few were found at Westmeath by White.

35. *Accipiter gentilis atricapillus* (Wilson).

EASTERN GOSHAWK. Occurs as a breeding bird at Golden Lake. On July 19, 1925, one was seen in the woods and "squeaked" to within forty feet of a dozen people. The next day a fully grown juvenile female was shot and it dropped into a nest in a dead aspen. The tree was felled and the nest contained a half egg shell of bluish cast, unmarked, many crow's feathers, and an accumulation of bones which were saved for further examination.

Another bird was seen at the same place on August 4, 1926.

A specimen in the Lloyd collection was taken by E. F. G. White at Wildcat pass, Egan Estate (near Eganville) in 1896, and another at Westmeath in October, 1906. He reports that a few occur there regularly and that one year they were very common.

36. *Accipiter striatus velox* (Wilson).

SHARP-SHINNED HAWK. Both sharp-shinned and Cooper's hawks are secretive and elusive when on their nesting territories and so no exact estimate can be made of the numbers present. Lanning saw lone sharp-shins at Combermere on August 28, 1942, and August 8 and 19, 1943.

One seen by Lloyd and Lanning at Combermere, August 5, 1944.

Seen at Golden Lake, July 20, 1925. Fairly common at Westmeath (White).

37. *Accipiter cooperii* (Bonaparte).

COOPER'S HAWK. Recorded at Combermere, July 14, 1941, August 7, 1942, August 8 and 22, 1943, and in 1944.

38. *Buteo jamaicensis borealis* (Gmelin).

EASTERN RED-TAILED HAWK. Met with only occasionally: one seen at Combermere on July 4, 1941; one on September 2, 1941, and one on August 22, 1943.

39. *Buteo lineatus lineatus* (Gmelin).

NORTHERN RED-SHOULDERED HAWK. At Combermere, one was recorded on July 14, 1941; and two on August 5 and August 30, 1943. Fairly common at Westmeath (White).

40. *Buteo platypterus platypterus* (Vieillot).

BROAD-WINGED HAWK. One was seen at Combermere July 10, 1942; two on July 18, 1942; and one from July 15 to 23, 1943.

Specimens were taken at Golden Lake on July 3, 1924, and July 20, 1925; the latter was feeding on nestling small birds. One

was seen there at close range in red pine-slashing on July 5, 1944.

One with a snake was seen at Mink Lake on August 11, 1924. Recorded at Westmeath in limited numbers (White).

41. *Haliaeetus leucocephalus washingtoniensis* (Audubon).

NORTHERN BALD EAGLE. Seen occasionally at Combermere each year from 1940 to 1944. The Game Warden said that there was an eyrie at Diamond Lake which has been used for years. It would seem probable that the birds wander in search for food from Diamond Lake to Combermere. White has seen adults and immature birds at Westmeath.

42. *Circus cyaneus hudsonius* (Linnaeus).

MARSH HAWK. Common and breeds at Combermere; dates recorded are July 4 and August 25, 1941. J. A. Crosby flushed one from grass on July 13, 1943, which was carrying a grackle in its talons. On August 4, 1944, Lloyd and Lanning saw one on the big marsh.

One was seen near Douglas on July 3 and on July 8, 1944; another near Killaloe, on July 7th. White says it is fairly common at Westmeath.

43. *Pandion haliaetus carolinensis* (Gmelin).

OSPREY. Seen regularly at Combermere where it breeds. A nest with three young was observed on August 8, 1941. Several birds were seen at the marsh on August 4, 1944, and nests were conspicuous there.

One was seen at Mink Lake on August 11, 1924, and another on July 15, 1928. H. A. Lloyd and Lloyd saw one fishing at Golden Lake on July 12, 1930. Noted by Brown, July 17, 1940. Three were found not far from Golden Lake village on July 9, 1945. A few have been seen at Westmeath by White.

44. *Falco peregrinus anatum* Bonaparte.

DUCK HAWK. One was seen by Edwards in August, 1941, at Bark Lake.

45. *Falco sparverius sparverius* Linnaeus.

EASTERN SPARROW HAWK. Seen at Combermere, probably breeds: dates, July 29, 1940, August 22, 1941, August 5, 1944, etc. Migrating family groups are quite often encountered in August on the sandy pine barrens. The young birds are feeding at this time almost entirely on very abundant grasshoppers (red-legged grasshoppers — and a large grey locust).

Found at Golden Lake on June 26, 1924. A few have been noted by White at Westmeath.

46. *Canachites canadensis canace* (Linnaeus).

CANADA SPRUCE GROUSE. Two specimens in the Lloyd collection were taken at Petawawa on November 5, 1902, by G. R. White. Also a few feathers received by Lloyd confirm the taking of a specimen by G. Sonley at Black Donald on November 11, 1943.

Edwards saw a male and four others, either females or immature, at Bark Lake on August 17, 1938.

47. *Bonasa umbellus togata* (Linnaeus).

CANADA RUFFED GROUSE. A common resident at Combermere; breeds. A hen with eight downy chicks was seen on August 12, 1939. Immature birds are usually sunning themselves singly along back roads by August 1st. During the summer of 1944 the grouse population reached a very low ebb, attributed by residents to the fact that the buds were iced over for a long period during the previous winter.

Uncommon during visits to Mink and Golden Lakes; unrecorded in most years. They were noted near camp at Mink Lake on August 4, 1925, and a brood of half-grown young ones was flushed on the shore of Golden Lake, July 27, 1944, by Wilmot and Hoyes Lloyd.

Two specimens in the Lloyd collection were taken at Westmeath by E. F. G. White in early November, 1921. He reports it as a common breeding bird there.

48. *Rallus limicola limicola* Vieillot.

VIRGINIA RAIL. One was seen at Combermere marsh on August 12, 1944. White reports that a few are found at Westmeath and that it breeds there.

49. *Porzana carolina* (Linnaeus).

SORA. Common at Westmeath and breeds there (White).

50. *Coturnicops noveboracensis noveboracensis* (Gmelin).

YELLOW RAIL. One was found dead at Westmeath by White.

51. *Gallinula chloropus cachinnans* Bangs.

FLORIDA GALLINULE. Rather common at Combermere marsh in August, 1943, when it was noted as follows: August 9 (1), 21 (2), 27 (7), 29 (3).

52. *Fulica americana americana* Gmelin.

AMERICAN COOT. Found at Combermere marsh on September 1, 1942, (1), and on August 27, 1943, (8). White reports a few at Westmeath; one year they were quite common.

53. *Charadrius vociferus vociferus* Linnaeus.
KILLDEER. Six seen at Combermere on August 4, 1939, and four on July 29, 1942.

Seen at Golden Lake during 1924, 1925 and 1926 visits; also during same years and 1927, at Mink Lake. At Golden Lake during 1944 it was noted on five occasions; also seen there a few times in 1945. Apparently a regular, but not very common summer resident. Noted at Golden Lake by Brown in 1939 and 1940.

54. *Squatarola squatarola* (Linnaeus).

BLACK-BELLIED PLOVER. White reports this species as fairly common at Westmeath.

55. *Philohela minor* (Gmelin).

AMERICAN WOODCOCK. One recorded at Combermere July 20, 1940. A fairly common breeding bird at Westmeath (White).

56. *Capella gallinago delicata* (Ord).

WILSON'S SNIPE. A rare resident in the Combermere marsh, where according to residents it nests.

Lanning heard its flight performance there July 19, 1942.

A common breeding bird at Westmeath (White).

57. *Numenius phaeopus hudsonicus* Latham.

HUDSONIAN CURLEW. Seen by Lanning on August 7, 1940, at Combermere marsh.

58. *Actitis macularia* (Linnaeus).

SPOTTED SANDPIPER. Occurs commonly and breeds at Combermere. A downy specimen was taken July 10, 1943. An adult bird in extremely fat condition taken on August 11, 1944, was apparently ready to start its migration.

A regular summer resident at Golden Lake and Mink Lake. Breeding dates at Golden Lake are June 27, 1924, and August 5, 1926. Brown has a juvenile specimen recorded for July 18, 1940. Common and breeding at Westmeath. White.

59. *Tringa solitaria solitaria* Wilson.

EASTERN SOLITARY SANDPIPER. Abundant migrant at Combermere in 1942 when water conditions were such that many suitable

mud flats were exposed. These were under water in 1943, when the species was recorded only once: not at all in 1944. The change in water level was due to hydro-electric power development.

60. *Totanus melanoleucus* (Gmelin).

GREATER YELLOW-LEGS. Common at Westmeath (White).

61. *Totanus flavipes* (Gmelin).

LESSER YELLOW-LEGS. A single bird was seen at Combermere, August 13, 1941. One was seen near Griffith on August 20, 1943, by Cringan. A few were found at Westmeath by White.

62. *Erolia melanotos* (Vieillot).

PECTORAL SANDPIPER. White reports this species as fairly common at Westmeath.

63. *Erolia minutilla* (Vieillot).

LEAST SANDPIPER. Five noted on marsh at Combermere, August 29, 1942.

64. *Limnodromus griseus griseus* (Gmelin).

EASTERN DOWITCHER. Found at Westmeath on one day only when several were shot by J. D. Roberts and Throop.

65. *Crocethia alba* (Pallas).

SANDERLING. One was seen at Combermere on September 3, 1942.

66. *Phalaropus fulicarius* (Linnaeus).

RED PHALAROPE. One taken at White Lake, ten miles from Arnprior, October 28, 1934, has been examined in the Bourguignon collection. On one occasion in October two were seen at Westmeath by White.

67. *Lobipes lobatus* (Linnaeus).

NORTHERN PHALAROPE. Several have been seen by White at Westmeath in the months of August and September.

68. *Larus argentatus smithsonianus* Coues.

HERRING GULL. There is a small breeding colony on an island in Lake Kaministiquia, eighty individuals being the largest number ever recorded, and many young birds visit the Madawaska River near Combermere.

At Golden Lake a few were seen most years between 1924 and 1930 inclusive, absent, or not observed in three years. In 1944 one bird was seen July 3, 6 and 8, while from July 25 to August 4 the daily record ran from 1 to 15, indicating a late summer influx. Probably more abundant in 1945 when the highest number per day in late July reached thirty.

Seen two years out of seven at Mink Lake. Common at Westmeath (White).

69. *Larus delawarensis* Ord.

RING-BILLED GULL. A specimen in the Bourguignon collection was taken at Westmeath by Mr. Davis in the fall of 1943.

70. *Larus philadelphia* (Ord).

BONAPARTE'S GULL. A few noted at Westmeath by White.

71. *Sterna* sp.?

One flock of small terns, probably common terns, was seen at Westmeath by White.

72. *Hydroprogne caspia* (Pallas).

CASPIAN TERN. Two records by White at Westmeath, one was found dead in the marsh, but too badly decayed to preserve.

73. *Zenaidura macroura carolinensis* (Linnaeus).

EASTERN MOURNING DOVE. One was seen at Golden Lake on July 4, 1924, one 10 miles west of Renfrew, August 8, 1926, and one at Arnprior on July 14, 1928.

Cringan records a flock of twenty flying south, near Griffith, August 25, 1943.

74. *Coccyzus erythrophthalmus* (Wilson).

BLACK-BILLED CUCKOO. Occurs regularly at Combermere: breeds. A female in breeding condition was taken there on July 17, 1943; also a nestling on July 14, 1943. There was a big influx of cuckoos in the region in the summer of 1943, following a large scale invasion of the area by the tent caterpillar, and again in 1944 cuckoos were quite common.

Observed most years at Golden Lake. One seen at Mink Lake in 1924.

75. *Otus asio naevius* (Gmelin).

EASTERN SCREECH OWL. One seen at Combermere on each of the following dates: August 22, 1942; July 16, 1943; August 20, 1943; and August 31, 1943. The only record for Golden Lake is by Brown, July 16, 1940.

76. *Bubo virginianus virginianus* (Gmelin).

GREAT HORNED OWL. Occasionally heard at Combermere — not common. Heard at Golden Lake July 19, 1925. White reports that a few occur at Westmeath and that it breeds there.

77. *Strix varia varia* Barton.

NORTHERN BARRED OWL. On August 20, 1941, one specimen was examined in the flesh near Palmer Rapids.

78. *Asio flammeus flammeus* (Pontoppidan). SHORT-EARED OWL. A few have been seen by White at Westmeath.

79. *Cryptoglaux acadica acadica* (Gmelin).

SAW-WHET OWL. One juvenile specimen was collected in an evergreen thicket at Golden Lake on July 10, 1945.

80. *Caprimulgus vociferus vociferus* Wilson. EASTERN WHIP-POOR-WILL. Heard quite commonly at Combermere. Found almost every year at Golden Lake; and at Mink Lake.

81. *Chordeiles minor minor* (Forster).

EASTERN NIGHTHAWK. Migration in loose flocks was noted in mid-August each year at Combermere.

Found regularly, but not very common at Golden Lake and Mink Lake. A probable nest at Golden Lake was located in stony ground at edge of woods, June 28, 1924. Usual record was one or two birds a day; slightly more numerous in 1945. Migration was noted at Mink Lake August 11, 1924.

82. *Chaetura pelagica* (Linnaeus).

CHIMNEY SWIFT. Common at Combermere; breeds. Nests with young were found on July 6 and 30, 1942, in an old chimney.

Seen every year and moderately common at Golden Lake and Mink Lake.

83. *Archilochus colubris* (Linnaeus).

RUBY-THROATED HUMMINGBIRD. Fairly common at Combermere.

Seen most years at Golden Lake and Mink Lake, but not common. Noted at Golden Lake by Brown, July 28, 1939.

84. *Megasceryle alcyon alcyon* (Linnaeus).

EASTERN BELTED KINGFISHER. Found commonly at Combermere, about three pairs per mile of river; breeds. An adult was observed feeding a young bird on August 12, 1942.

Observed every year at Golden Lake and Mink Lake. On most days one or two would be seen.

85. *Colaptes auratus luteus* Bangs.

NORTHERN FLICKER. Rare, 1940-41 at Combermere; common, 1942-43-44.

Common at Golden Lake, where it is noted as breeding, June 28, 1924; and common at Mink Lake.

86. *Ceophloeus pileatus abieticola* Bangs.

NORTHERN PILEATED WOODPECKER. Quite uncommon; seen several times at Combermere.

Two flew through the woods near camp at Golden Lake on July 8, 1944.

87. *Sphyrapicus varius varius* (Linnaeus).
YELLOW-BELLIED SAPSUCKER. Quite uncommon at Combermere.

Seen almost every year at Golden Lake where it is moderately common and breeds. Noted by Brown as breeding, July 24, 1939. On July 13, 1945, an adult with newly fledged young was found in dense mixed woods near the shore of Golden Lake. The young appeared to be "on their own" by July 25. Young birds were seen in several places on the 26th. Less common at Mink Lake where it was noted in some years.

88. *Dryobates villosus villosus* (Linnaeus).
EASTERN HAIRY WOODPECKER. One specimen was taken at Combermere, July 31, 1943. They were common that year, but seen only two or three times a summer in other years.

Found at Golden Lake in five years out of nine, and then never common. Noted by Brown, July 28, 1939.

89. *Dryobates pubescens medianus* (Swainson).

NORTHERN DOWNY WOODPECKER. Regularly found, but uncommon, at Combermere; breeds. Two adults were seen with three young on August 1, 1942. A specimen was taken on July 13, 1943.

Seen almost every year in small numbers at Golden Lake, where a breeding record is dated July 7, 1944; also, on July 12, 1945, a female was seen feeding two young. Regularly found, but not very common at Mink Lake.

90. *Picoides tridactylus bacatus* Bangs.
AMERICAN THREE-TOED WOODPECKER. An adult male was seen at Combermere on July 20, 1940, at close range as it foraged on a large white pine.

91. *Tyrannus tyrannus* (Linnaeus).
EASTERN KINGBIRD. Abundant and breeds at Combermere where the high water which has drowned forest areas has produced habitat much to the kingbird's liking. A nest with four young was found on July 15, 1941. A specimen was taken July 18, 1943.

Occurs in abundance almost every year at Golden Lake and Mink Lake. At Golden Lake, on July 26, 1945, a nest was found in an apple tree by the roadside.

92. *Myiarchus crinitus boreus* Bangs.
NORTHERN CRESTED FLYCATCHER. Unobtrusive and rather uncommon at Combermere. Recorded once in 1941, once in 1942, ten times in 1943, and four times in 1944.

Found most years at Golden Lake and Mink Lake, but rather uncommon. Noted by Brown, July 16, 1940, Golden Lake.

93. *Sayornis phoebe* (Latham).
EASTERN PHOEBE. Found occasionally each year and breeds at Combermere. A deserted nest with two infertile eggs was found on June 30, 1942.

It has been found five years out of nine at Golden Lake where it breeds; two out of seven, at Mink Lake. Brown found this species at Golden Lake in 1939 and 1940. Probably occurs regularly, but rather uncommon. A nest with large young was found at Golden Lake on July 8, 1945; boys brought in a fully fledged young one on July 24, 1945; and phoebes were seen flying in family parties on July 28, 1945.

94. *Empidonax flaviventris* (Baird and Baird).
YELLOW-BELLIED FLYCATCHER. Three of these birds were studied carefully on July 19, 1943, as they fed among some alders on the river bank, Combermere.

95. *Empidonax traillii traillii* (Audubon).
ALDER FLYCATCHER. One was seen July 16, 1943, by J. A. Crosby at Combermere.

96. *Empidonax minimus* (Baird and Baird).
LEAST FLYCATCHER. Found regularly and commonly and breeds at Combermere. Young birds seen on July 20, 1942. Eggs in a nest found twenty-five feet up in a white pine tree on July 16, 1942, were addled when the nest was again visited on the 19th. The nest was two hundred yards within a heavy second growth stand of poplar and alder with but a few pines. In 1943 nesting records were made as follows: one young being fed, July 15 and July 16; and nest with young found on July 22. A specimen was taken on August 5, 1944. It is of interest to note that from August 10 to 20, 1943, the least flycatchers were calling clearly during the night.

Fairly common at Golden Lake where it has been recorded every year. Breeding dates are June 28, 1924, and July 13, 1930. It has been seen with less regularity on visits to Mink Lake.

97. *Myiochanes virens* (Linnaeus).

EASTERN WOOD PEWEE. Found regularly at Combermere but never more than three birds were recorded for any one day.

Occurs in limited numbers during most years at Golden Lake. Brown found it in 1939 and 1940. Status at Mink Lake about the same.

98. *Nuttallornis borealis* (Swainson).

OLIVE-SIDED FLYCATCHER. Rare, but breeds at Combermere; an occupied nest containing young was found at Palmer's Rapid on July 22, 1943. It was placed on a horizontal branch eight feet from the trunk and thirty feet from the ground in a spruce tree.

Rare at Golden Lake where I noted one on July 20, 1925; one was seen almost daily from July 28 to August 3, 1944; and one was seen several times in swampy woods from July 11 to August 1, 1945. Brown records it on July 27, 1939.

Noticed once at Mink Lake, July 25, 1927.

99. *Otocoris alpestris praticola* Henshaw.

PRAIRIE HORNED LARK. One seen by J. A. Crosby on July 16, 1943, at Combermere.

Two noted while observer travelled by motor car from Mink Lake to Golden Lake July 11, 1929. On July 7, 1944, one was found near Killaloe, ten miles from Golden Lake camp. Numbers have been seen while driving between Golden Lake and Ottawa.

100. *Iridoprocne bicolor* (Vieillot).

TREE SWALLOW. Rare at Combermere and, if found at all, just the odd bird in a mixed flock of swallows.

Found at Golden Lake and Mink Lake in moderate numbers in some years, absent entirely in others. Birds seen in July and August are undoubtedly migrants.

101. *Riparia riparia riparia* (Linnaeus).

BANK SWALLOW. In August, 1943, these birds were often found in the large mixed flocks of migrating swallows at Combermere.

Uncommon at Golden Lake and at Mink Lake: not seen there at all in many of the years of record. Noticed by Brown at Golden Lake, July 24, 1939. At Golden Lake on July 4, 1945, there were young birds in at least one of eight nests found in the edge of a small gravel pit.

102. *Hirundo rustica erythrogaster* Boddaert.
BARN SWALLOW. An abundant summer resident which nests commonly in most barns at Combermere. A nest with seven young

was found on August 8, 1940; and one with six eggs on July 5, 1941.

Abundant during all visits to Golden and Mink Lakes. Nesting date for Golden Lake: July 2, 1924. A juvenile specimen in the Lloyd collection was found there on July 14, 1930.

103. *Petrochelidon pyrrhonata pyrrhonata* (Vieillot).

NORTHERN CLIFF SWALLOW. Recorded at Combermere once in 1942, eight times in 1943, and once in 1944. In 1943, on August 20th a mixed flock of swallows contained 24 of this species. This large flock of migrants fed over the marshes or dry barrens and their numbers continued to increase until September 2 when there were 100 birds of this species. During the following night the flock moved away. This was the second swallow migration; the first large flock having moved south about August 15.

At Golden Lake seen yearly from 1924 to 1930 inclusive. It was fairly common in 1929 when 25 were noted July 13, and 20 on July 14. During the same period of years it was rare at Mink Lake and missing entirely during several visits. On July 14, 1930, fifty were recorded between Golden and Mink Lakes. Two nests were found at Golden Lake on July 2, 1924.

In the long Golden Lake visit of 1944 not one was seen. A pair was there in 1945 and one of them flew in under the eaves of Yourth's barn on July 26, undoubtedly to a nest.

104. *Progne subis subis* (Linnaeus).

PURPLE MARTIN. Not noticed at Combermere.

Uncommon at both Golden and Mink Lakes: missing entirely from the record of many visits. During the 1944 visit to Golden Lake two were seen on July 5, ten on July 10, one on July 30. In 1945 a few were seen at Golden Lake camp, coming from a small colony at a summer resort on the lake shore a few miles distant.

105. *Cyanocitta cristata bromia* Oberholser.

NORTHERN BLUE JAY. Rare at Combermere where it is encountered more commonly in August than July.

Found in very limited numbers at Golden Lake in some years; not at all in others. Noted by Brown, July 16, 1940. The largest number recorded for one day was five, August 1, 1944. Recorded for Mink Lake for two visits out of seven.

106. *Corvus brachyrhynchos brachyrhynchos* Brehm.

EASTERN CROW. Found every day at Combermere and quite abundantly, six or eight a day being the average, and occasionally big flocks are encountered, as on July 20, 1943, when 96 birds were recorded.

Fairly common at Golden Lake and at Mink Lake during most visits. None was noted at Mink Lake in 1928 and at Golden Lake in 1929. It was common during the 1944 visit to Golden Lake, and young birds were seen there on July 4; also, young were noted, July 8, 1945. Found by Brown July 24, 1939, breeding; and July 16, 1940.

107. *Parus atricapillus atricapillus* Linnaeus. BLACK-CAPPED CHICKADEE. Eight or ten found every day at Combermere; family flocks with young being fed were occasionally encountered.

Seen regularly and in some numbers at Golden Lake and Mink Lake. On July 26 and 27, 1944, at Golden Lake, numbers noticed were considerably higher than usual, possibly indicating first movements of family parties, or an early migration. Increase in late July was also noticed in 1945.

108. *Sitta carolinensis cookei* Oberholser. WHITE-BREASTED NUTHATCH. Never encountered at Combermere.

Found in small numbers on about one half of the visits to Golden and Mink Lakes. Found by Brown July 24, 1939.

Three were seen by Cringan near Griffith, July 23, 1943.

109. *Sitta canadensis* Linnaeus. RED-BREASTED NUTHATCH. Noticed at Combermere about every third or fourth day — occasionally six or seven birds would be found either indicating migration or family flocks. A specimen was taken July 22, 1943.

Identified at Golden Lake on July 19 and 20, 1925; on July 4, 31, and August 2, 1944; and on July 27, 28, 30 and 31, 1945. Not seen at Mink Lake.

110. *Certhia familiaris americana* Bonaparte. BROWN CREEPER. Found once at Combermere where it was seen on August 16, 1944.

Not seen at Golden Lake: one record for Mink Lake, August 10, 1924.

111. *Troglodytes aëdon baldwini* Oberholser. OHIO HOUSE WREN. Found commonly about the village or around farm houses at Combermere: breeds. Nest with eggs was seen in a box, July 17, 1940.

Abundant at Golden Lake: breeds. Nesting evidence is dated June 27, 1924, and July 13, 1929. A young bird injured on the highway was prepared as a specimen on July 7, 1945. In 1944 became inconspicuous or was absent after late July. Present, but not so common at Mink Lake.

112. *Troglodytes troglodytes hiemalis* Vieillot. EASTERN WINTER WREN. Encountered singing occasionally at Combermere. Noted there, August 5, 1944.

One to several were found during most of the visits to Golden Lake. Not seen at Mink Lake.

113. *Telmatoodytes palustris palustris* (Wilson). LONG-BILLED MARSH WREN. It is present only in the limited cat-tails of the large Combermere marsh. Several were recorded there on July 15, 1943, and some were seen at the same place on August 4, 1944.

114. *Dumetella carolinensis* (Linnaeus). CATBIRD. Quite rare at Combermere; only occasionally encountered. On July 16, 1940, a nest with four young was found there and another nest with small young was found on August 5, 1944.

Occurs regularly in moderate numbers at Golden Lake. Not found at Mink Lake.

115. *Toxostoma rufum rufum* (Linnaeus). BROWN THRASHER. Uncommon and irregular at Combermere where it breeds. A nest with three eggs was recorded on July 9, 1942.

Moderately common and seen almost every year at Golden Lake. Not seen at Mink Lake, although a number were recorded on July 14, 1930, a day which included observations at both camps, and along the intervening country roads.

116. *Turdus migratorius migratorius* Linnaeus. EASTERN ROBIN. Regularly encountered, about twelve per day, at Combermere. Nests, each with four young, were found at Combermere on June 29 and July 3, 1941.

Abundant at Golden Lake and Mink Lake at time of all visits. Nests commonly at Golden Lake where adults were feeding young in the nest, high in a red pine near the Y.M.C.A. dining hall on July 5, 1945. A Golden Lake juvenile in the Lloyd collection is dated August 7, 1926.

117. *Hylocichla mustelina* (Gmelin). WOOD THRUSH. Encountered four times at Combermere in July 1943. On July 16,

1943, an immature bird of this species was carefully studied but eluded attempts to collect it. Heard singing clearly on July 12, 1943, when two birds were present.

Recorded for Golden Lake on July 28, 1939, by Brown.

118. *Hylocichla guttata faxoni* Bangs and Penard.

EASTERN HERMIT THRUSH. One or two birds found regularly each day at Combermere. The full song chorus of thrushes is usually over by July 20th and few birds are heard singing after the first of August. Nests found at Combermere: one with an infertile egg, July 9, 1940; one with three eggs, July 18, 1943.

Occurs regularly at Golden Lake where one to several were found on almost every visit. Has been found less commonly at Mink Lake, where it was not located at all on some visits.

119. *Hylocichla ustulata swainsoni* (Tschudi). OLIVE-BACKED THRUSH. Not nearly as common as the Hermit Thrush at Combermere, but occurs sparingly. A nest containing three large young and one infertile egg was found there on July 15, 1942.

It has been recorded by sight or sound in mid-July in several years at Golden Lake and probably occurs there.

120. *Hylocichla fuscescens fuscescens* (Stephens).

VEERY. Quite common at Combermere where it is the most abundant thrush. Two or three are usually recorded most days in July; fewer in August.

Breeds at Combermere where one young bird was being fed by parents on July 7, 1942.

Has been found during every visit to Golden Lake, usually in limited numbers. It is seldom recorded in late July, no doubt because singing has ceased then. Noted on one visit to Mink Lake.

121. *Sialia sialis sialis* (Linnaeus).

EASTERN BLUEBIRD. A rare breeding bird of the barren flats, at Combermere, but an abundant migrant in August when large flocks are encountered. Nesting dates are July 19, 1941, three young and one egg; July 24, 1941, four eggs; July 2, 1942, three young.

Scarce at both Golden and Mink Lakes; although seen in limited numbers along the roads of the county almost every year.

122. *Regulus satrapa satrapa* Lichtenstein. EASTERN GOLDEN-CROWNED KINGLET.

One seen July 18, 1943 by J. A. Crosby at Combermere. A juvenile specimen was taken in dense tall spruces at Golden Lake on July 28, 1945.

123. *Regulus calendula calendula* (Linnaeus). EASTERN RUBY-CROWNED KINGLET. Not recorded at Combermere.

One seen in the early morning near camp at Golden Lake July 31, 1944.

124. *Bombycilla cedrorum* Vieillot.

CEDAR WAXWING. Abundant breeding bird at Combermere where many nests with eggs or young have been found.

Common at Golden Lake; abundant in some years. Breeding dates are noted as July 2, 1924, and July 28, 1944. In 1924 two nests were placed in red pines near the tent; one high up, and the other well out on a side limb. The 1944 record refers to a young bird out of the nest being fed by a parent. One juvenile specimen in Lloyd collection is dated July 19, 1927. Found at Mink Lake during most of the visits there.

125. *Lanius ludovicianus migrans* Palmer. MIGRANT SHRIKE. One was seen within five miles of Golden Lake on July 14, 1929; one noted near Douglas, July 3, 1944.

126. *Sturnus vulgaris vulgaris* Linnaeus. STARLING. Common breeding bird along fences and about farms near Combermere. Definite breeding records for Combermere are: nest with four young, July 15, 1940; nest with two young, July 19, 1941.

First noted at Golden Lake on July 12, 1929, when twenty-five were seen. Many were recorded between Ottawa and Golden Lake on July 10, 1930, and one was seen at Golden Lake, July 12, 1930. Seen by Brown, July 25, 1939. The 1944 Golden Lake record is one seen July 5, and two seen July 7. Estimate of those seen between Ottawa and Golden Lake on July 23 is 300 birds. About 200 were seen at Barry's Bay on August 7, 1944. They were noticed at Golden Lake almost daily between July 4 and 14, 1945, but in late July and early August were seen only in farmland between Ottawa and camp. None seen at Mink Lake from 1924 to 1930 inclusive.

127. *Vireo solitarius solitarius* (Wilson). BLUE-HEADED VIREO. Very uncommon at Combermere; breeds. A nest, seven feet from the ground in a pine tree, together with one

infertile egg was collected on July 16, 1940. Migrant birds are seen only occasionally in August.

128. *Vireo olivaceus* (Linnaeus).

RED-EYED VIREO. Abundant and breeds at Combermere: an adult was feeding small young there on July 9, 1941, and fully fledged young were being fed by parents on August 6, 1944. Recorded on August 20, 1943, as the only bird still singing regularly.

Abundant at both Golden Lake and Mink Lake. A breeding date for Golden Lake is July 26, 1944. On August 1, 1945 an adult was feeding flying young.

129. *Vireo philadelphicus* (Cassin).

PHILADELPHIA VIREO. A male bird in worn breeding plumage was taken at Combermere on July 26, 1943.

130. *Vireo gilvus gilvus* (Vieillot).

EASTERN WARBLING VIREO. One seen July 11, 1943, at Combermere.

One was identified at Golden Lake village on July 13, 1930.

131. *Mniotilta varia* (Linnaeus).

BLACK AND WHITE WARBLER. One or two recorded about every fifth or sixth day at Combermere. Breeds: two young being fed by parent, July 9, 1942. Specimen of immature male was taken July 17, 1943.

Observed almost every year at both Golden and Mink Lakes; usually fairly common. One only was noted in early July at Golden Lake in 1945, but from July 26 to August 3 they occurred in considerable numbers. Brown's Golden Lake dates are July 24, 1939 and July 15, 1940.

132. *Vermivora celata celata* (Say).

ORANGE-CROWNED WARBLER. One record for Combermere, August 3, 1942. Lanning identified this bird carefully in a stand of young pines.

133. *Vermivora ruficapilla ruficapilla* (Wilson).

NASHVILLE WARBLER. One was seen on August 24, 1942 and the species was identified four times in July, 1943, at Combermere.

Brown records this species at Golden Lake on July 26, 1939 and July 16, 1940.

134. *Dendroica petechia aestiva* (Gmelin).

EASTERN YELLOW WARBLER. The Combermere record shows that about three birds were observed every four days. Latest recorded date is August 21, 1943. Breeds: a nestling was taken on July 10, 1943.

Found every year at Golden Lake, except 1926 when visit was in early August. Not usually noted after July 20th. Several young birds were seen following a parent at Golden Lake village, July 13, 1930, and a late date for parents with young is August 1, 1945.

135. *Dendroica magnolia* (Wilson).

MAGNOLIA WARBLER. Recorded at Combermere three times in 1942. On July 15, 1943, J. A. Crosby found there an adult feeding one large young.

Seen at Golden Lake July 20, 1925, July 4, 1944, July 28, 1944, August 2, 1944, July 10, 1945, and July 14, 1945. The July 28 record was made on a morning when there was a flight of warblers, perhaps the first migrants. Recorded by Brown as breeding, July 26, 1939. Noted at Mink Lake on July 15, 1930.

136. *Dendroica tigrina* (Gmelin).

CAPE MAY WARBLER. Two were seen in a small group of migrants passing along the wooded shore of Golden Lake, August 7, 1944.

137. *Dendroica caerulescens caerulescens* (Gmelin).

BLACK-THROATED BLUE WARBLER. Occasionally found at Combermere: breeds. On July 15, 1942 an adult was feeding two young in a loose migrating flock. Birds were seen there on August 25, 1942, and five were recorded on July 16, 1943.

One seen with other warblers near shore of Golden Lake, August 7, 1944. Recorded by Brown, July 26, 1939.

138. *Dendroica coronata coronata* (Linnaeus).

MYRTLE WARBLER. Common nesting species at Combermere, four or five individuals noted on most days. Adults were noticed with young on August 6, 1944, and on many other dates.

Found regularly in most years at Golden Lake: breeds. Very numerous at end of July, 1944. Adults were seen feeding a cowbird on July 31, August 1, 3 and 7; and feeding young myrtles on August 3. Seen several times feeding young in July and early August, 1945. Noted on most visits to Mink Lake.

139. *Dendroica virens virens* (Gmelin).

BLACK-THROATED GREEN WARBLER. Encountered occasionally at Combermere, but never in numbers: breeds. On July 15, 1942, three young were being fed by their parents and on August 6, 1942, two young were being fed.

Found fairly regularly at Golden Lake, where it keeps to dense evergreen cover. One adult was seen being followed by a young one on July 27, 1945.

140. *Dendroica fusca* (Müller).

BLACKBURNIAN WARBLER. One or two recorded occasionally at Combermere; — far from common. On October 13, 1940 a large dense flock, entirely of this species, and comprising fifty individuals was found; an unexpectedly late date.

Noted at Golden Lake with fair regularity. Brown saw this species, July 24, 1939. Not seen at Mink Lake except on August 11, 1924, when a number were observed, no doubt in migration.

141. *Dendroica pensylvanica* (Linnaeus).

CHESTNUT-SIDED WARBLER. Common at Combermere in 1942 — not uncommon during other years: breeds; an immature specimen was taken, July 16, 1943.

Seen in limited numbers during some visits to Golden Lake. A juvenile noted on July 31, 1945 did not seem to have travelled far.

142. *Dendroica castanea* (Wilson).

BAY-BREASTED WARBLER. A male in worn breeding plumage was noted at Combermere on July 20, 1940.

Two were seen at Golden Lake with other warblers on July 19, 1928.

143. *Dendroica pinus pinus* (Wilson).

NORTHERN PINE WARBLER. Rare at Combermere where it was noted once or twice a year in 1942, 1943, and 1944.

Found regularly in limited numbers at Golden Lake. A specimen was taken July 6, 1944. It breeds and parents were seen feeding young on July 27 and August 2, 1944, and again in 1945.

One was identified at Mink Lake, July 16, 1928.

144. *Seiurus aurocapillus aurocapillus* (Linnaeus).

OVEN-BIRD. Not very common at Combermere; and none was seen after July 26: breeds; one large young noted being fed on July 16, 1943.

Found with fair regularity in limited numbers at Golden Lake. More noticeable in early than in late July. Identified at Mink Lake in 1929 and 1930.

145. *Seiurus noveboracensis noveboracensis* (Gmelin).

NORTHERN WATER-THRUSH. Commonly found at Combermere; however their numbers depend much upon the height of the water; when too high, much suitable habitat is destroyed. Breeds: adults were seen feeding three young on July 3, 1942.

A few seen at Golden Lake in some years; and the record for Mink Lake is about the same. Not recorded for about half the years at Golden and Mink Lakes.

146. *Oporornis philadelphia* (Wilson).

MOURNING WARBLER. One male was seen at Combermere on July 14, 1944. One was found singing in a shrubby clearing at Golden Lake on July 12 and 13, 1945; the ninth year observations have been made in that area. Not found at Mink Lake.

147. *Geothlypis trichas brachidactyla* (Swainson).

NORTHERN YELLOW-THROAT. Found quite commonly in fair numbers at Combermere and breeds there. A nest with young was found on July 3, 1940. An adult male specimen taken on July 26, 1943 was in full molt.

Occurs in fair numbers at Golden Lake where it was identified on the occasion of every visit. One noted at Mink Lake on August 4, 1925.

148. *Wilsonia pusilla pusilla* (Wilson).

WILSON'S WARBLER. A male bird was seen on August 24, 1942, at Combermere.

149. *Wilsonia canadensis* (Linnaeus).

CANADA WARBLER. Found commonly at Combermere and family groups were often encountered. A young bird was seen being fed by parents at Combermere on July 15, 1942. An immature male was taken from several seen on August 5, 1944.

Seen at Golden Lake on July 3 and 4, 1924; and on July 28, 30, and August 7, 1944.

150. *Setophaga ruticilla* (Linnaeus).

AMERICAN REDSTART. Found regularly but not commonly at Combermere; breeds. Young were seen being fed by parents on July 14, 1942.

Seen in fair numbers on almost every visit to Golden Lake and Mink Lake. Nests at Golden Lake where a female was noticed feeding nestlings on July 9, 1945, with the male singing nearby.

151. *Passer domesticus domesticus* (Linnaeus).

ENGLISH SPARROW. The English sparrow population at Combermere consists of about fifty birds in late August. A nest with five young was seen there, July 10, 1941.

Not seen at Golden Lake camp in 1944, although probably occurs about some farm buildings and in villages. Seen at Killaloe on August 7, 1944; first ones to be recorded as the observers travelled from Combermere to Ottawa. Three were recorded for July 6, 1945, during a trip by car from Golden Lake camp to Killaloe.

Thompson (1888 — *Forest and Stream*, Vol. 30 No. 11) recorded this species as being numerous at Pembroke since 1883.

152. *Dolichonyx oryzivorus* (Linnaeus).

BOBOLINK. One male in summer plumage was seen at Golden Lake, August 7, 1926. Recorded as breeding by Brown, July 26, 1939. One singing male was found in cultivated hay land near Golden Lake Village on July 9, 1945, and another in farm land between Golden Lake and Pembroke, July 11, 1945. Cringan saw three males near Griffith, July 7, 1943.

153. *Sturnella magna magna* (Linnaeus).

EASTERN MEADOWLARK. Recorded five times in 1943, but in no other year at Combermere.

Not often found at Golden Lake and Mink Lake camps, but noticed regularly in some numbers when observer was travelling to or from these camps through the farmlands of the county.

154. *Agelaius phoeniceus phoeniceus* (Linnaeus).

EASTERN RED-WING. Abundant breeding bird at Combermere. Great flocks of 1-3,000 birds congregate in August on the Combermere marsh and feed in the neighbouring fields and barrens. A specimen was taken at Combermere on July 21, 1943. Breeds: nest and young found August 6, 1941.

Has been recorded on about one half of the visits to Golden Lake. Noted by Brown, July 25, 1939 and July 16, 1940. Fairly common through July and in early August 1944. Noticed less frequently at Mink Lake during visits there.

155. *Icterus galbula* (Linnaeus).

BALTIMORE ORIOLE. Rare at Combermere. Three were seen and an old nest found on July 29, 1942; on six occasions one or two

birds were noticed in July 1943; and fifteen birds in all were recorded in August 1944.

Found with fair regularity in limited numbers during most years at Golden Lake. A nesting date is July 12, 1930. On July 5, 1945, David Brown and Don Hollingworth brought in a dead fledgling which they had picked up near the highway, Golden Lake camp. A few were found in some years at Mink Lake.

156. *Euphagus carolinus* (Müller).

RUSTY BLACKBIRD. One was seen at Combermere, August 7, 1943. Cringan reports two seen at Griffith on August 2, 1943.

157. *Quiscalus versicolor* Vieillot.

BRONZED GRACKLE. Common and breeds at Combermere. Large flocks feed on the blueberries and grasshoppers of the sandy barren plains. An immature specimen was taken July 19, 1943. A nest with four young was found in a small alder in a marsh about three feet above the surface of the water on July 26, 1941.

Observed in rather small numbers every year at Golden Lake. Abundant at Golden Lake in early part of July 1945. Seen most years at Mink Lake. Before the end of July the scattered breeding population gathers in large flocks and the birds may then be absent or nearly so from the small areas under observation. Thus two birds were seen at Mink Lake on July 24, 1927, all that were noticed that visit, whereas it is estimated that one thousand were seen on July 26th between Mink Lake and Ottawa. A specimen in Lloyd collection was taken at Golden Lake, August 4, 1926.

158. *Molothrus ater ater* (Boddaert).

EASTERN COWBIRD. Found with fair regularity at Combermere — breeds apparently quite commonly; foster parents being myrtle warbler, red-eyed vireo, northern yellow-throat, chestnut-sided warbler, yellow warbler, and chipping sparrow. It is of interest to note that a young cowbird was being fed by a male myrtle warbler and two red-eyed vireos on August 10, 1943.

Observed in most years in limited numbers at Golden Lake. A breeding record is furnished by the fact that on July 31, August 1, 3, and 7, 1944, adult myrtle warblers were feeding a young cowbird. Also on August 3, 1945, myrtle warblers and chipping sparrows were feeding young cowbirds there. Noted at Mink Lake in 1924 and 1930.

159. *Piranga olivacea* (Gmelin).

SCARLET TANAGER. One was seen at Combermere, August 6, 1944: it was in green plumage with black wings.

Not found in visits to Golden Lake until 1945 when one was seen in the camp woods on July 8, and one in heavy hardwood and hemlock forest, July 12. A male in bright plumage was seen by Cringan, near Griffith, on August 16, 1943.

Single birds were seen at Mink Lake on July 24, 1927, and July 15 and 17, 1930.

160. *Pheucticus ludovicianus* (Linnaeus).

ROSE-BREASTED GROSBEAK. Occasionally encountered each year at Combermere. Common, July 10 to 17, 1944. Breeds: a female and young were found July 20, 1940.

A few were noted at Golden Lake during the 1924, 1925, 1928, and 1930 visits. None was seen during the stay of 19 days in 1944. One adult male was found on July 14, 1945. Breeds: adults were seen feeding a large young one on June 27, 1924. One or two were seen at Mink Lake in both 1928 and 1930: absent from the record for other years.

161. *Passerina cyanea* (Linnaeus).

INDIGO BUNTING. Found very irregularly at Combermere; probably only two pairs having been located in four summers. There is in reality little suitable habitat and the locality is apparently north of the regular range.

A few were observed during most of the visits to Golden Lake. Noted by Brown, July 24, 1939. One to several were noted daily in 1944. In 1945 their status was similar. A deserted nest with one egg was found near the ground in ferns on July 4, and adults were seen accompanied by young birds on July 25 and July 27. In one case the young were being fed ripe raspberries. Found at Mink Lake on two dates only, July 16 and 17, 1930.

162. *Hesperiphona vespertina vespertina*

(Cooper).

EASTERN EVENING GROSBEAK. Hewitt saw about 24 west of Cobden, on November 26, 1945.

163. *Carpodacus purpureus purpureus*

(Gmelin).

EASTERN PURPLE FINCH. A very common resident on the sandy pine barren at Combermere. Noticed in numbers July 10-17, 1944.

At Golden Lake this species was found in some numbers from 1924 to 1930, inclusive, being abundant in the latter year, 15 or more daily. Noted by Brown in 1939 and 1940. It was found in very limited numbers, two to three daily, in late July and early August 1944. It was fairly common in 1945 and adults were carrying food for young on July 24. It was recorded in limited numbers on about half the visits to Mink Lake, but was common in 1930; four to ten daily.

164. *Pinicola enucleator leucura* (Müller).

CANADIAN PINE GROSBEAK. Eight pine grosbeaks were seen at Combermere on August 4, 1943, as they flew past and then alighted in a conifer grove.

A specimen in the Lloyd collection was taken by Reverend Father C. J. Jones at Calabogie, January 5, 1934.

165. *Spinus tristis tristis* (Linnaeus).

EASTERN GOLDFINCH. Found very regularly at Combermere — about three or four birds seen daily.

Abundant on every visit to Golden Lake. Breeds: boys found a dead nestling on August 7, 1926; now in Lloyd collection.

Fairly abundant and noted on every visit to Mink Lake.

166. *Loxia leucoptera leucoptera* Gmelin.

WHITE-WINGED CROSSBILL. None found at Combermere.

Seen on one occasion at Golden Lake. On July 12, 1930, the event of the 6 a.m. bird walk was to find great flocks of these birds. They went clicking by with dozens to hundreds in the flocks. Half a dozen pitched into a spruce tree near by, a red male on top, a red male on each side, and some dull ones in between: a brilliant and beautiful sight. The estimate of the number seen was 400.

167. *Passerculus sandwichensis savanna* (Wilson).

EASTERN SAVANNAH SPARROW. Rare at Combermere in most years although three or four were encountered each day for about a week in July 1943 (12th to 18th).

A few have been found in the course of over half the visits to Golden Lake. Never very common. Not seen at Mink Lake, although the records show it common enough in farm land traversed between Ottawa and the camp.

168. *Poocetes gramineus gramineus* (Gmelin).

EASTERN VESPER SPARROW. A very common resident of the fern-bracken barren lands around Combermere. Breeds: on July 2, 1942 a large young was observed being fed. A male specimen was taken July 14, 1943.

Common and observed in fair numbers daily at Golden Lake. A nest with five eggs was found July 8, 1944.

Also common at Mink Lake and seen on every visit. A nest with eggs was found on August 10, 1924.

169. *Junco hyemalis hyemalis* (Linnaeus).

SLATE-COLORED JUNCO. Rare at Combermere, seen in 1942 (2), in 1943 (2), and in 1944 (1).

Found at Golden Lake in small numbers on more than half of the visits there. During one of the early visits to this camp a nest was found in the outside wall of a roadside ditch in heavy woods. A young bird killed itself in the dining room, July 19, 1925, and the specimen was saved. One group including juveniles was found in heavy spruce woods on July 28, 1945.

Found in limited numbers at Mink Lake on less than half the visits to that camp.

170. *Spizella passerina passerina* (Bechstein).

EASTERN CHIPPING SPARROW. A very abundant resident of the dry plains, nesting in the lower limbs of pines or in small bushes if available. A specimen was taken at Combermere July 16, 1943. One definite breeding record is afforded by nest with three young found in a thorn bush on July 20, 1940.

Abundant at Golden Lake on all visits there. Breeds: parents feeding young out of nest July 27, 1944; young being fed in nest, July 28, 1944; parents feeding young out of nest, July 30, 1944. A nest was noticed in which human hair had been used instead of the usual — or should one say formerly usual — horse-hair. A juvenile specimen in the Lloyd collection is dated July 13, 1930, Golden Lake.

Abundant at Mink Lake on all visits.

171. *Spizella pallida* (Swainson).

CLAY-COLORED SPARROW. The only specimen known for the Ottawa Valley was taken near Golden Lake, July 11, 1930. (Can. Field-Nat. 47: 36. 1933).

172. *Zonotrichia albicollis* (Gmelin).

WHITE-THROATED SPARROW. Fairly com-

mon at Combermere, especially so in July 1943 when the average record was four daily. Specimens taken: a male on July 17, 1943; a juvenile on August 9, 1942; and a juvenile female, August 5, 1944. Breeds: three young were seen being fed by parent on July 4, 1942.

Observed every year at Golden Lake, usually in small numbers. More numerous in 1930 than any other year in the available record.

Considerably scarcer at Mink Lake. Noted on over half the visits there. It was commoner in 1930 than in other years.

173. *Melospiza georgiana georgiana* (Latham).

SWAMP SPARROW. Rare at Combermere, recorded twice in 1942, three times in 1943, and four times in 1944. Observed there August 4, and 5, 1944.

Noticed at Golden Lake on July 3, 1924 only: not much suitable habitat near camp.

174. *Melospiza melodia melodia* (Wilson).

EASTERN SONG SPARROW. Common at Combermere; average daily total ten birds. A specimen was taken there July 16, 1943. Nests, each with three eggs, were found July 17 and 19, 1940.

Abundant on the occasion of every visit to Golden Lake and Mink Lake. A nesting date for Mink Lake is August 2, 1926.

175. *Calcarius lapponicus lapponicus* (Linnaeus).

LAPLAND LONGSPUR. A specimen in the Bourguignon collection was taken by him at Westmeath, September 30, 1943.

176. *Plectrophenax nivalis nivalis* (Linnaeus).

EASTERN SNOW BUNTING. Bourguignon reports this species present in thousands at Westmeath in October. There is a specimen from there in his collection.

Hewitt saw 80-100 on the highway five miles west of Renfrew, November 26, 1945.

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CHRISTMAS BIRD CENSUS — 1947¹

Port Mouton, Queens County, N.S. — Dec. 31, 1947. Overcast; light wind; deep snow; temp. 20°F.; about 3 miles on foot. Black Duck, 7; Sharp-shinned Hawk, 1; Ruffed Grouse, 1; Great Black-backed Gull, 15; Herring Gull, 100; Hairy Woodpecker, 2; Downy Woodpecker, 2; Canada Jay, 2; Blue Jay, 3; Raven, 2; Crow, 5; Starling, 25; Junco, 2; Song Sparrow, 1; Snow Bunting, 7. Total: 15 species, 175 individuals. — H. F. Tufts.

Wolfville, N.S. — Dec. 30, 1947. All day. Overcast; temp. 18°F.; deep snow; light wind. Three observers, working separately part time. Approx. 10 miles on foot. Black Duck, 7; American Merganser, 1; Goshawk, 1; Hungarian Partridge, 14; Pheasant, 7; Great Black-backed Gull, 1; Herring Gull, 10; Flicker, 1; Crow, 57; Black-capped Chickadee, 1; Starling, 31; English Sparrow, 32; Junco, 6; Song Sparrow, 1. Total, 14 species, 170 individuals. — R. W. Tufts, John S. Erskine and David Erskine.

Bayhead, Colchester County, N.S. — (Mixed woodland 50%, open pasture 40%, river shore 10%). December 23, 1947; 1 p.m. to 5 p.m. Overcast; temp. 10°F.; two inches of snow; ponds and creeks frozen; rivers partly open. Two observers together, about eight miles on foot. Canada Goose, 1; Black Duck, 32; Ruffed Grouse, 9; Herring Gull, 3; Hairy Woodpecker, 2; Raven, 8; Crow, 11; Blue Jay, 2; Canada Jay, 1; Black-capped Chickadee, 6; Brown-headed Chickadee, 2; Golden-crowned Kinglet, 8; Starling, 1; English Sparrow, 10; Tree Sparrow, 2. Total, 15 species, 98 individuals. — Elva MacDonald, Stuart MacDonald.

Quebec, Que. — (same area as in 1946). Dec. 20, 1947. 7.30 a.m. to 4 p.m.; clear until 1 p.m., then partly cloudy; temp. 0° to 12°F.; wind SW, 4-7 m.p.h.; 8-15 in. snow on ground; small rivers completely frozen, moving ice on St. Lawrence River. Five observers in 5 parties. Total hours, 30 (on foot); total miles, 27 (on foot). Ruffed Grouse, 5; Pheasant, 1; Hairy Woodpecker, 2; Downy Woodpecker, 6; Blue Jay, 3; Crow, 9; Black-capped Chickadee, 57; Red-breasted Nuthatch, 4; White-breasted Nuthatch, 1; Robin, 3; Starling, 90; English Sparrow, 47; Evening Grosbeak, 13; Pine Grosbeak, 30; Redpoll, 18; Pine Siskin, 5; Goldfinch, 8; White-winged Crossbill,

21; Junco, 1; Snow Bunting, 11. Total, 20 species, 335 individuals. (Seen in area Dec. 18: Purple Finch, 1.) — Mrs. G. Langelier, Louis-A. Lord, Louis Lemieux, François Hamel, Raymond Cayouette. (La Société Zoologique de Québec.)

Montreal, Que. — (Mount Royal, LaSalle Woods, Verdun, Crawford Park, Cote St. Paul Woods, St. Lambert, Tiffin Woods, South Shore of the St. Lawrence River from Caughnawaga to Jacques Cartier Bridge and North Shore from Dorval to Victoria Bridge, Heron Island, Nun's Island, Cartierville and Black River) — December 21, 1947. Light snow most of the day, no sunshine; light wind, 3 to 10 m.p.h., NNE up to 1.30 p.m., then shifting to WSW; temp. 10.4° to 18.7°F.; depth of snow in open country, 9½ inches. 26 observers in 8 parties; total miles on foot: 32, by boat: 9, by automobile: 117; total hours, 45. Common Loon, 2; Mallard, 9; Black Duck, 110; (est.); American Golden-eye, 483 (est.); American Merganser, 54 (est.); Red-breasted Merganser, 41; Sparrow Hawk, 2; Ruffed Grouse, 1; Pheasant, 101 (est.); Great Black-backed Gull, 11; Herring Gull, 170 (est.); Great Horned Owl, 5; Snowy Owl, 2; Short-eared Owl, 5; Downy Woodpecker, 12; Canada Jay, 1 (Ryan); Crow, 150; Black-capped Chickadee, 22; Brown Creeper, 4; Robin, 5; Cedar Waxwing, 70; Northern Shrike, 2; Starling, 460 (est.); English Sparrow, 788 (est.); Red-winged Blackbird, 1; Redpoll, 4; Song Sparrow, 7; Snow Bunting, 83. Total species, 29; total individuals, 2,605 (est.). Seen within a week: December 14, Myrtle Warbler (Chambly), Hairy Woodpecker, White-breasted Nuthatch; December 16 and 18, Duck Hawk; December 27, Junco. — Miss M. E. Bower, P. Boulton, Mrs. P. Boulton, H. A. Bunker, J. A. Decarie, D. G. Elliot, Mrs. D. G. Elliot, J. D. Fry, Miss M. Furness, B. Gollop, Miss G. E. Hibbard, H. A. C. Jackson, A. Johnson, J. G. M. LeMoine, A. Livingstone, W. M. MacBride, I. McLaren, G. H. Montgomery, Mrs. G. H. Montgomery, G. G. Ommann, R. Rodgers, J. A. Rolland, D. Ryan, E. Skinner, L. McI. Terrill, Mrs. L. McI. Terrill.

Hudson Heights, Que. — (same area as in 1943). — Dec. 28; 7.30 a.m. to 4.30 p.m. Dull early with snow, clearing at noon, then fine snow; temp. 22° to 27°F.; wind NW 4 m.p.h. to 11 a.m. then backing to W to 20 m.p.h.;

¹) Received for Publication February 28, 1948.

bar. steady 29.36"; 8-12 inches undrifted snow on ground; some running streams open, all other water frozen. Twenty-five observers in 6 parties. Total hours, 42 on foot; total miles 45. Ruffed Grouse, 7; Hairy Woodpecker, 2; Downy Woodpecker, 6; Blue Jay, 58; Crow, 4; Black-capped Chickadee, 93; White-breasted Nuthatch, 10; Red-breasted Nuthatch, 2; Golden-crowned Kinglet, 1; Starling, 37; English Sparrow, 16; Redpoll, 12; Goldfinch, 1; Junco, 14. Total, 14 species; 263 individuals. (Seen in area during count period: Pine Grosbeak, 2). — Mr. and Mrs. W. Brosche, Awdrey and Violet Bryan, Amy Clarke, Ed. and Eunice Croll, Mr. and Mrs. D. G. Elliot, Dorothy Gurdon, Miss G. A. Jackson, Mrs. J. J. Legate, A. R. Lepingwell, Mrs. D. L. Macaulay, Dunbar and Violet Mullan, John and Mary Mullan, Cecil Nelson, Geof. and Kate Ommanney, Mrs. R. L. Puxley, George and Drucilla Riley, E. B. Watson.

Ottawa, Ont. — (radially about city). — Dec. 21; clear; no wind; temp. 5°-20°F.; 8" snow on ground; open water at rapids. 28 observers in 12 parties. Am. Golden-eye, 147; Am. Merganser, 33; Sharp-shinned Hawk, 1; Sparrow Hawk, 1; Ruffed Grouse, 16; Pheasant, 20; Glaucous Gull, 1; Herring Gull, 1; Rock Dove, 127; Screech Owl, 1; Great Horned Owl, 1; Pileated Woodpecker, 1; Hairy Woodpecker, 6; Downy Woodpecker, 8; Blue Jay, 3; Crow, 27; Black-capped Chickadee, 59; White-breasted Nuthatch, 18; Brown Creeper, 3; Robin, 2; Cedar Waxwing, 40; Northern Shrike, 2; Starling, 301; English Sparrow, 1,565; Bronzed Grackle, 1; Redpoll, 80; Pine Siskin, 95; Goldfinch, 37; Slate-coloured Junco, 2; Tree Sparrow, 2; Song Sparrow, 3. Total, 31 species, 2,605 individuals. — H. and E. Lloyd, A. Breitung, R. Frith, Mr. and Mrs. C. H. Bennett, C. Nieghorn, G. Cooch, D. Savile, Mr. and Mrs. J. W. Groves, O. Hewitt, M. Spencer, G. Hammond, E. Godfrey, K. Bowles, C. Frankton, M. Patterson, Mr. and Mrs. V. Solman, Mr. and Mrs. F. Banfield, D. Fisher, M. Mason, A. Bourguignon, M. Stuart, V. Ross, L. McKinnon, (Ottawa Field-Naturalists' Club).

Pakenham, Lanark County, Ont. — Dec. 26, 1947. 9 a.m. to 4 p.m. Fair; no wind; 11 inches snow; temp. 9° to 18°F. Seven observers, two parties. Total miles, 17 on foot, 24 by car. Am. Golden-eye, 1; Ruffed Grouse, 13; Rock Dove, 6; Belted Kingfisher, 1; Pileated Woodpecker, 1; Hairy Woodpecker, 1;

Downy Woodpecker, 4; Blue Jay, 10; Black-capped Chickadee, 24; White-breasted Nuthatch, 3; Red-breasted Nuthatch, 2; Brown Creeper, 1; Golden-crowned Kinglet, 2; Starling, 1; English Sparrow, 56; Redpoll, 20; Pine Siskin, 11; Goldfinch, 12; White-winged Crossbill, 27; Snow Bunting, 2. Total, 20 species, 196 individuals. Seen during census period, Sharp-shinned Hawk, 1; Goshawk, 1; Crow, 1; Canada Jay, 1; Junco, 3. — Edna G. Ross, Verna M. Ross, A. F. Ross, Douglas Deugo, Bill McKenzie, R. M. McKenzie, T. W. Ross.

Rutherglen, Ontario, Canada. (15 miles east of North Bay to 10 miles west of Mattawa.) — December 23, 1947; Variable, cloudless; temp. 6° to 21°; wind 2 to 10 m.p.h., NE, SE to NW; ground covered with 17 inches of soft snow; all fresh water except rapids frozen. Hairy Woodpecker, 1; Blue Jay, 2; Black-capped Chickadee, 20; Brown-headed Chickadee, 2; Red-breasted Nuthatch, 10; Brown Creeper, 2; Evening Grosbeak, 9; Purple Finch, 18; Pine Siskin, 81; Goldfinch, 17; Red Crossbill, 2; White-winged Crossbill, 17; Snow Bunting, 10. Total: 13 species, 191 individuals. Total hours: 9; total miles: 35, partly on foot and partly by car. — Louise de Kiriline Lawrence.

Peterborough, Ont. — December 27, 1947; 9 a.m. to 4.30 p.m.; cloudy in a.m.; wind west 3-5 m.p.h.; snowstorm in late afternoon; temp. 15°F.; 8 inches of snow; 16 miles by car, 7½ on foot. Am. Golden-eye, 14; Am. Merganser, 2; Ruffed Grouse, 2; Blue Jay, 8; Black-capped Chickadee, 6; White-breasted Nuthatch, 2; Golden-crowned Kinglet, 1; Starling, 5; English Sparrow, 6; Junco, 10. Total, 10 species, 56 individuals. — J. L. McKeever, R. L. Hale, J. D. Hooper.

Ripley, Ontario. — Dec. 28, 1947. Temp. 20°F.; wind W; blowing snow; total hours, 5; total miles, 10. Am. Merganser, 2; Herring Gull, 11; Great Horned Owl, 2; Screech Owl, 1; Hairy Woodpecker, 1; Downy Woodpecker, 3; Blue Jay, 2; Black-capped Chickadee, 5; Brown Creeper, 1; Starling, 100; English Sparrow, 225; Junco, 2; Snow Bunting, 300. — Murray Cameron, Albert Wylids.

Toronto, Ont. — Dec. 28, 1947. 7.45 a.m. to 5.30 p.m.; total hours, 106½; clear; temp. 23°F.; light cover of snow; seventy-four observers in twenty parties. Great Blue Heron, 1; Canada Goose, 1; Mallard, 643; Black Duck, 1,931; Baldpate, 3; Pintail, 3; Wood Duck, 1;

Canvasback, 3; Greater Scaup, 1,335; Am. Golden-eye, 548; Bufflehead, 80; Old-squaw, 1,193; Am. Merganser, 29; Sharp-shinned Hawk, 2; Cooper's Hawk, 3; Red-tailed Hawk, 32; Rough-legged Hawk, 4; Marsh Hawk, 4; Sparrow Hawk, 14; Pigeon Hawk, 1; Ruffed Grouse, 4; Pheasant, 168; Great Black-backed Gull, 17; Herring Gull, 233; Ring-billed Gull, 16; Screech Owl, 4; Great Horned Owl, 9; Long-eared Owl, 9; Short-eared Owl, 1; Saw-whet Owl, 2; Kingfisher, 2; Flicker, 8; Hairy Woodpecker, 1; Downy Woodpecker, 53; Blue Jay, 76; Crow, 381; Black-capped Chickadee, 280; White-breasted Nuthatch, 18; Red-breasted Nuthatch, 5; Brown Creeper, 45; Winter Wren, 6; Brown Thrasher, 1; Robin, 8; Hermit Thrush, 1; Golden-crowned Kinglet, 67; American Pipit, 1; Cedar Waxwing, 70; Northern Shrike, 3; Starling, 1,286; English Sparrow, 923; Meadowlark, 9; Red-winged Blackbird, 7; Rusty Blackbird, 9; Bronzed Grackle, 1; Cardinal, 78; Evening Grosbeak, 5; Purple Finch, 1; Pine Siskin, 3; Goldfinch, 26; Red Crossbill, 4; White-winged Crossbill, 2; Vesper Sparrow, 1; Junco, 909; Tree Sparrow, 457; Field Sparrow, 2; White-throated Sparrow, 25; Fox Sparrow, 2; Lapland Longspur, 1; Song Sparrow, 56; Snow Bunting, 1,001. Total, 70 species, 12,131 individuals. — R. Anderson, J. L. Baillie, J. Barnett, D. Beacham, G. S. Bell, O. D. Boggs, A. Bunker, W. Carrick, C. H. D. Clarke, F. Cook, A. Cringan, A. Dawe, M. Devitt, O. E. Devitt, R. Y. Edwards, F. H. Emery, B. Falls, N. Field, A. Fowle, D. Fowle, G. Gibson, G. Giles, W. Giles, A. Gordon, W. W. H. Gunn, P. Harrington, C. Helleiner, F. Helleiner, C. Hope, M. Jackson, R. James, S. Kennedy, G. Lambert, R. Lanning, R. V. Lindsay, C. Long, J. MacArthur, J. W. MacArthur, R. MacArthur, D. MacDonald, C. McFayden, N. Martin, W. Martin, A. J. Michener, D. Miller, R. Miller, M. Mitchell, A. A. Outram, L. Paterson, D. Perks, R. Ritchie, G. Roberts, R. J. Rutter, J. Satterly, R. M. Saunders, D. Scovell, J. Sherrin, T. M. Shortt, D. Smith, F. Smith, W. W. Smith, L. L. Snyder, H. H. Southam, D. Speirs, J. M. Speirs, F. A. E. Starr, T. Swift, R. Tasker, S. L. Thompson, R. Trowern, V. Trowern, R. D. Ussher, L. Walden, D. West. (The Brodie Club).

Hamilton, Ont. (Ancaster, Dundas, Hamilton and Harbor, Burlington Beach, Bronte, Aldershot, Waterdown, Lake Medad). — Dec. 21; 8 a.m. to 5 p.m. Overcast; temp. 33°F. to 40°F.; wind N to SW, 15 m.p.h.; 2 in. old snow; marshes frozen, harbor open. Fifty-five ob-

servers in 19 parties. Total hours, 109; total miles, 229 (191 on foot, 38 by car). Red-throated Loon, 2; Holboell's Grebe, 1; Gannet, 1 (imm., here Dec. 14 to Jan. 2 — I.H., GWN); Great Blue Heron, 2; Black-crowned Night Heron, 1; Black Duck, 60; Ring-necked Duck, 4; Canvasback, 1; Greater Scaup, 220; Am. Golden-eye, 185; Buffle-head, 3; Old-squaw, 29; White-winged Scoter, 1; Ruddy duck, 1 (H.K., G.W.N., J.H.W.); Hooded Merganser, 3; Am. Merganser, 1,500 (est.); Red-breasted Merganser, 200 (est.); Goshawk, 2; Sharp-shinned Hawk, 1; Cooper's Hawk, 3; Red-tailed Hawk, 19; Marsh Hawk, 5; Sparrow Hawk, 5; Ruffed Grouse, 8; Pheasant, 10; Florida Gallinule, 1 (plus one found dead); Black-backed Gull, 47; Herring Gull, 2,500 (est.); Ring-billed Gull, 18; Mourning Dove, 9; Screech Owl, 2; Great Horned Owl, 9; Snowy Owl, 1; Long-eared Owl, 2; Short-eared Owl, 2; Kingfisher, 3; Flicker, 10; Hairy Woodpecker, 13; Downy Woodpecker, 58; Horned Lark, 1; Blue Jay, 66; Crow, 5; Black-capped Chickadee, 234; White-breasted Nuthatch, 22; Red-breasted Nuthatch, 1; Brown Creeper, 22; Winter Wren, 9; Long-billed Marsh Wren, 1 (N.B.); Robin, 8; Hermit Thrush, 2 (G.W.N., L.S.); Golden-crowned Kinglet, 38; Cedar Waxwing, 278; Starling, 2,504 (est.); English Sparrow, 938 (est.); Red-winged Blackbird, 1; Rusty Blackbird, 1; Cardinal, 54; Purple Finch, 9; Redpoll, 33; Goldfinch, 9; White-winged Crossbill, 13 (two flocks, K.C., J.D.); Junco, 875; Tree Sparrow, 518; White-throated Sparrow, 1; Swamp Sparrow, 5; Song Sparrow, 54; Snow Bunting, 26. Total, 67 species; about 10,670 individuals. (Seen since Census: Am. Scoter, 1; Red-shouldered Hawk, 1; Barred Owl, 1; Tufted Titmouse, 1; Catbird, 1; Ruby-crowned Kinglet, 1; Bohemian Waxwing, 1; Northern Shrike, 2; Meadowlark, 1; Vesper Sparrow, 3. — Edith Austen, Dean Axelson, Eric Bastin, Don, Neil, and Mr. and Mrs. R. D. F. Bourne, Wm. Campbell, Reginald Clark, N. C. Clarke, K. J. Cox, John A. Crosby, Bill Cudmore, Jim Dowell, Mrs. W. B. Duncan, Esther Elstone, Lena Elstone, R. O. Elstone, J. A. Farmer, Mrs. J. G. Farmer, Bob Finlayson, Ian Halladay, Donald Harvey, George Holland, Paul Holmes, H. E. Kettle, Margaret Lamb, Jack Large, Peter Large, George Lennie, Eleanor Malcolm, J. A. Mannheimer, R. P. Markle, Jack Martin, Neil Matthews, John Moule, Gertrude Nelson, George W. North, Mrs. N. M. Robertson, Bob Sergeant, James Shaw,

Doris H. Speirs, J. M. Speirs, Grace Stewart, Laura Stewart, Gordon Sweatman, George Updegrove, Wm. Waldhof, Isabel, Jimmie, and Mabel Watson, Mrs. M. R. Watters, J. H. Williams, Laurel E. Williams, James Wood (members and friends of Hamilton Nature Club).

Kitchener, Ont. — N.E. to Bridgeport, W. to Westmount Golf Club, S. to Galt, E. to Breslau. Open farm land 24%, deciduous woods 25%, evergreen woods 14%, swamp 11%, river-banks 25%, town limits 1%. — Dec. 21, dawn to dusk. Overcast; temp. 28°F.-30°F.; Wind W., 20 m.p.h.; ground covered with 6 inches snow; Grand R. open in mid-stream; 25 observers in 7 parties. Total hours 52. Total miles on foot 50. Great Blue Heron, 3; Mallard, 185; Black Duck, 232; Am. Golden-eye, 175; Am. Merganser, 46; Sharp-shinned Hawk, 2; Ruffed Grouse, 10; Pheasant, 4; Herring Gull, 23; Rock Dove, 5; Great Horned Owl, 3; Belted Kingfisher, 1; Hairy Woodpecker, 4; Downy Woodpecker, 15; Blue Jay, 26; Crow, 3; Black-capped Chickadee, 203; White-breasted Nuthatch, 10; Red-breasted Nuthatch, 13; Brown Creeper, 25; Winter Wren, 4; Golden-crowned Kinglet, 30; Starling, 79; English Sparrow, 345; Cardinal, 37; Pine Siskin, 11; Goldfinch, 5; Junco, 304; Tree Sparrow, 34; Song Sparrow, 2; Snow Bunting, 100. Total, 31 species; 1,939 individuals. (Dec. 26. Red-shouldered Hawk, 1; Holboell's Grebe, 1. — Bender, F.; Boothby, R. A.; Campbell, M.; Carter, Mr. and Mrs. E.; Davis, Mr. and Mrs. R. M.; Dickson, Mr. and Mrs. F. W. R.; Gildner, D.; Hilborn, P. R.; Hilborn, Mr. and Mrs. R. C.; Kirkness, Marie; Maines, F. T.; Montgomery, F. H.; Pickering, R.; Power, J.; Schaefer, G.; Schaefer, W.; Shantz, F.; Smith, P.; Tilt, R.; Wambold, L.; Williamson, D.

Pelham Township, Niagara Peninsula, Ont. — Dec. 26. 10 a.m. to 3 p.m.; temp. 26°F.; overcast; calm; 3 in. snow on ground; 15 miles by car, 4 on foot. Cooper's Hawk, 1; Pigeon Hawk, 1; Ruffed Grouse, 2; Great Horned Owl, 1; Downy Woodpecker, 4; Blue Jay, 3; Crow, 3; Black-capped Chickadee, 7; Starling, 1; English Sparrow, 18; Junco, 56; Song Sparrow, 2; Tree Sparrow, 98. Total, 13 species, 197 individuals. — Stewart Myers, Mr. and Mrs. James A. Selby.

London, Ont. (Valley of the Thames River from London to Delaware; Redman's swamp; Trott's swamp; Coves; Tin Springs and "Eagle" woods; also 2 feeding stations in the same area.) Pasture 5%; deciduous woodland 20%;

swamp 20%; mixed wooded river bank 55%. Dec. 27, 8 a.m.-4.30 p.m.; sky overcast changing to broken late in day; visibility poor; wind light at first, S.W., changing about 11 a.m. to W., 15 m.p.h.; 6 in. snow on the level; temp. 24°F.; river mostly open; streams mostly frozen. 38 observers in 12 parties; total party hours, 50; total party miles, 90 (30 on foot, 60 by car). Great Blue Heron, 1; Black Duck, 7; Am. Golden-eye, 174; Am. Merganser, 75; Cooper's Hawk, 2; Sharp-shinned Hawk, 2; Goshawk, 1; Red-tailed Hawk, 9; Rough-legged Hawk, 4; Bald Eagle, 4; Sparrow Hawk, 1; Pheasant, 2; Herring Gull, 9; Mourning Dove, 6; Rock Dove, 25 (est.); Great Horned Owl, 3; Belted Kingfisher, 2; Flicker, 1; Pileated Woodpecker, 2; Hairy Woodpecker, 1; Downy Woodpecker, 21; Blue-Jay, 52; Crow, 55 (est.); Black-capped Chickadee, 118; Brown-headed Chickadee, 1; White-breasted Nuthatch, 51; Red-breasted Nuthatch, 2; Brown Creeper, 24; Winter Wren, 5; Brown Thrasher, 1; Robin, 1; Golden-crowned Kinglet, 62; Starling, 285 (est.); English Sparrow, 275 (est.); Red-winged Blackbird, 2; Cardinal, 111; Redpoll, 4; Goldfinch, 13; Junco, 170 (est.); Tree Sparrow, 70; Song Sparrow, 28. Total, 41 species, about 1450 individuals. (Observed in area recently, Snow Bunting, Myrtle Warbler, Short-eared Owl, Screech Owl, Meadowlark.) Mary Abbott, A. Glendenning, Barry Camp, R. G. Cummings, Mrs. Cummings, John and Tommy Cummings, Irene Chapman, Eli Davis, Kay Fetherston, Margaret Ferrier, Frank Girling, W. G. Girling, Ted. Garside, J. C. Higgins, Don. Higgins, Mary Harvey, John Harvey, George Harvey, Mr. Harvey, Mrs. Harvey, Ron. Hambly, Howard Keast, Alan Loughrey, James Leach, C. Maddeford, Wm. Morris, M. J. Markham, Miss Marwood, Sidney Pratt, Millar Stewart, Mrs. Stewart, Margaret Stevens, Mr. J. Skelton, Miss M. Skelton, Helen and Ada Shipley, Charles WhiteIaw. (McIlwraith Ornithological Club members.)

Blenheim, Kent County, Ont. (Fargo, Blenheim, Morpeth, Cedar Springs, Erie Beach, Erieau and Rondeau Provincial Park). Dec. 26. 8:30 a.m. to 5 p.m. Sky overcast in a.m. partly clear in p.m. Visibility fair; 4-6 inches of snow on the level, slight snow in p.m. Wind moderate. Temperature 27°F.; Lake Erie open with ice on shore; Erieau Harbour with floating ice in the channel; marsh areas frozen. Seventeen observers in five parties. Total party hours, 32; total party miles, on

foot 25; by car 65. Pied-billed Grebe, 1; Great Blue Heron, 1; Canvasback, 1; Greater Scaup, 3; Am. Merganser, 9; Goshawk, 1; Sharp-shinned Hawk, 7; Cooper's Hawk, 1; Red-tailed Hawk, 4; Rough-legged Hawk, 8; Bald Eagle, 9; Marsh Hawk, 7; Sparrow Hawk, 2; Coot, 10; Killdeer, 1; Herring Gull, 67; Ring-billed Gull, 1; Bonaparte's Gull, 1; Mourning Dove, 28; Great Horned Owl, 2; Screech Owl, 1; Flicker, 2; Hairy Woodpecker, 4; Downy Woodpecker, 21; Blue Jay, 7; Crow, 205; Black-capped Chickadee, 7; White-breasted Nuthatch, 2; Brown Creeper, 4; Robin, 1; Golden-crowned Kinglet, 13; Cedar Waxwing, 4; Starling, 253; English Sparrow, 1000; Red-winged Blackbird, 1; Rusty Blackbird, 3; Cardinal, 20; Junco, 102; Tree Sparrow, 350; Chipping Sparrow, 5; (D.H.Y.); Song Sparrow, 8. Total, 42 species, 2161 individuals.

Seen in the district recently: Robins, 16; Red-eyed Towhee, 3; Lapland Longspurs, 30.

C. M. Anderson, D. A. Arnott, Robt. Barry, R. Blackburn, Dr. L. J. Bohn, Ken. Davey, Harold English, Hugh Evans, Charles Fox, W. M. Gray, Rev. Hugh Stewart, Dr. G. M. Stirrett, R. Schafer, H. B. Wressell, D. Harry Young, Harold and Perry Zavitz; members of the Kent Nature Club and friends.

Sarnia, Ont. — Dec. 29. Dawn to dusk. Temp. 18° F.; clear in a.m., turning cloudy in p.m.; light S.W. wind. Common Loon, 3; Canvasback, 1; Scaup, 300; Am. Golden-eye, 300; Am. Merganser, 300; Cooper's Hawk, 1; Red-shouldered Hawk, 2; Pheasant, 15; Herring Gull, 75; Ring-billed Gull, 18; Mourning Dove, 3; Downy Woodpecker, 3; Blue Jay, 2; Crow, 1; English Sparrow, 300; Starling, 25; Cardinal, 2; Junco, 1; Tree Sparrow, 30; Song Sparrow, 1; Snow Bunting, 400. Total, 21 species, 1783 individuals. Seen during census period: Hooded Merganser, 3; Black Duck, 4; Buffle-head, 2. — Angus Buchanan, O. C. Dennis, Arthur Storey.

Meaford, Ont. (including east half of town and two miles east along the shore; feeding stations in town; part of the escarpment 11th line N.). — Dec. 29, 1947. Temp. 20° F.; sky overcast; light N.W. winds, snowing most of the day. 10 observers in 2 parties. Am. Golden-eye, 1; Am. Merganser, 14; Bald Eagle, 1; Ruffed Grouse, 5; Hungarian Partridge, 9; Herring Gull, 200; Rock Dove, 45; Downy Woodpecker, 2; Blue Jay, 13; Crow, 8; Black-capped Chickadee, 26; White-breasted Nut-

hatch, 3; Golden-crowned Kinglet, 1; Cedar Waxwing, 15; Starling, 200; Northern Shrike, 1; English Sparrow, 500; Cardinal, 1; Song Sparrow, 3. Total, 19 species, 1048 individuals. — L. H. Beamer.

Port Arthur-Fort William, Ont. (Silver Harbour to Kakabeka Falls and to Pigeon River); Dec. 26, 1947. 9.30 a.m. to 4.30 p.m. Cloudy; temp. 5° to 23° F.; wind S.W. 10 m.p.h.; humidity 87 per cent; 5 to 10 inches of snow; 20 observers in 8 parties; 214 miles by car, 20 miles on foot. Am. Golden-eye, 7; Am. Merganser, 2; Goshawk, 1; Ruffed Grouse, 2; Hungarian Partridge, 5; Rock Dove, 168; Herring Gull, 82; Ring-billed Gull, 1; Hairy Woodpecker, 6; Downy Woodpecker, 15; Canada Jay, 4; Blue Jay, 12; Raven, 11; Crow, 14; Black-capped Chickadee, 52; Red-breasted Nuthatch, 3; Robin, 6; Bohemian Waxwing, 273; Cedar Waxwing, 1; Starling, 188; English Sparrow, 465; Bronzed Grackle, 1; Evening Grosbeak, 134; Pine Grosbeak, 23; Purple Finch, 1; Hoary Redpoll, 1; Common Redpoll, 45; Tree Sparrow, 1; Snow Bunting, 290. Total 29 species, 1814 individuals. — Mr. and Mrs. P. Addison, William Addison, Dr. and Mrs. A. E. Allin, David Allin, Mr. and Mrs. R. M. Beckett, Donald Beckett, Douglas Beckett, Keith Denis, David Denis, Anton de Vos, C. E. Garton, Miss Jaffray, W. M. Knowles, Mr. and Mrs. C. H. Philpot, Mr. and Mrs. C. Rydholm, J. Thompson. (Thunder Bay Field Naturalists' Club).

Winnipeg, Manitoba. — Dec. 28, Temp. 0° to 11° F.; snow about 13 inches deep; S.E. wind at 10 miles an hour. 8 parties, 7 feeding stations. Am. Golden-eye, 1; Am. Merganser, 4; Red-breasted Merganser, 1; Falcon, Prairie (?), 1; Ruffed Grouse, 3; Sharp-tailed Grouse, 11; Hungarian Partridge, 62; Pheasant, 1; Screech Owl, 1; Great Horned Owl, 2; Saw-whet Owl, 1; Pileated Woodpecker, 1; Hairy Woodpecker, 4; Downy Woodpecker, 12; Blue Jay, 23; Black-capped Chickadee, 43; White-breasted Nuthatch, 23; Red-breasted Nuthatch, 1; Brown Creeper, 2; Robin, 1; Bohemian Waxwing, 35; Northern Shrike, 1; Starling, est. 400; Evening Grosbeak, 2; Pine Grosbeak, 94; Redpoll, 14; Snow Bunting, est. 350. Total, 27 species, 1,094 individuals. — H. Copland, Mrs. A. Downes, Miss W. Downes, R. Fryer, O. Gibson, H. Hosford, W. Johnston, V. B. Latta, A. G. Lawrence, H. Mossop, A. H. Shortt, G. Smith, R. W. Sutton. Feeding stations of Miss G. Childs, Mrs. A. Haak, Mrs.

A. G. Isaac, Mrs. J. S. Jones, Mrs. H. Macdonald, Mrs. E. J. McMillan, Mrs. H. D. Whellams, (Natural History Society of Manitoba).

Yorkton, Sask. (area 15 miles in diameter with Yorkton as center). — Dec. 26; 9 a.m. to 5 p.m. Clear, bright day; calm in the morning, but N.W. wind at 15 m.p.h. by late afternoon; loose snow, 20" to 24" deep. Temp. 20° to 34° F. 9 observers in 5 groups. Total party hours 12 (5 by car and 7 on foot); total party miles, 38½ (34 by car and 4½ on foot). Ruffed Grouse, 3; Sharp-tailed Grouse, 76; Hungarian Partridge, 14; Downy Woodpecker, 3; Canada Jay, 1; Blue Jay, 7; Magpie, 4; Black-capped Chickadee, 4; Bohemian Waxwing, 58 (est.); English Sparrow, 217; Snow Bunting, 4. Total, 11 species, approximately 391 individuals. — Jim Allen, Brother Clarence, Jim Davis, Fred Dicker, Dr. C. J. Houston, C. Stuart Houston, Fred Langstaff, Mrs. J. Meekma, Nathaniel Olson. (Yorkton Natural History Society).

Camrose, Alberta. — Dec. 31. Noon to 4 p.m.; clear; temp. 20° F.; 4 in. snow on ground. Mallard, 11; Ruffed Grouse, 2; Sharp-tailed Grouse, 7; Pheasant, 10; Pileated Woodpecker, 2; Downy Woodpecker, 1; Am. Three-toed Woodpecker, 1; Black-capped Chickadee, 20; Brown-headed Chickadee, 1; Bohemian Waxwing, 35; Evening Grosbeak, 30; Pine Grosbeak, 22; Redpoll, 25; White-winged Crossbill, 15. Total, 14 species, 182 individuals. — Alex Ross, Fred Ditburner, F. L. Farley.

Summerland, B.C. — Dec. 21. 8 a.m. to 3.30 p.m. Cloudy; mild; strong S. wind. 12 miles lake front, 4 miles fruit benches. Holboell's Grebe, 1; Horned Grebe, 2; Great Blue Heron, 2; Mallard, 80; Gadwall, 21; Baldpate, 2; Am. Golden-eye, 8; Bufflehead, 1; Goshawk, 1; Rough-legged Hawk, 1; Bald Eagle, 2; Golden Eagle, 1; Pigeon Hawk, 1; Sparrow Hawk, 2; California Quail, 20; Pheasant, 35; Coot, 1760; Killdeer, 2; Herring Gull, 5; Flicker, 31; Downy Woodpecker, 1; Steller's Jay, 5; Magpie, 62; Raven, 6; Clarke's Nutcracker, 1; Black-capped Chickadee, 10; Mountain Chickadee, 4; Red-breasted Nuthatch, 2; Pygmy Nuthatch, 40; Brown Creeper, 2; Winter Wren, 4; Western Bluebird, 18; Townsend's Solitaire, 1; Bohemian Waxwing, 100; Northern Shrike, 3; English Sparrow, 130; Evening Grosbeak, 50; Pine Grosbeak, 1; Pine Siskin, 6; Goldfinch, 25; Junco, 170; Song Sparrow, 20. Total, 42 species, 2562 individuals.

— Eric M. Tait, Herbert M. Simpson, S. J. Darcus, W. C. Fosbery.

New Westminster, B.C. — Dec. 26. 10.30 a.m. to 3.30 p.m. Overcast; temp. 40° F.; visibility fair; wind nil. App. 6 miles on foot. Holboell's Grebe, 5; Mallard, 1; Green-winged Teal, 1; Scaup Duck, 352; Am. Golden-eye, 1; Red-tailed Hawk, 1; Marsh Hawk, 1; Pheasant, 1; Wilson's Snipe, 1; Glaucous-winged Gull, 117; Herring Gull, 103; Short-billed Gull, 15; Rock Dove, 5; Flicker, 6; Downy Woodpecker, 3; Black-capped Chickadee, 138; Coast Bush-tit, 9; Brown Creeper, 1; Bewick's Wren, 6; Varied Thrush, 3; English Sparrow, 8; Pine Siskin, 545; Purple Finch, 3; Evening Grosbeak, 18; Spotted Towhee, 17; Junco, 3; White-crowned Sparrow, 6; Song Sparrow, 47. Total, 28 species, 1468 individuals. — Harry Middleton, W. S. Maguire.

Crescent, B.C. (Fields, bush and coast between Ocean Park and estuary of Serpentine River. Also White Rock pier). — Dec. 29. 8 a.m. to 4 p.m.; clear; calm. Temp. 34° F. Common Loon, 13; Pacific Loon, 1; Horned Grebe, 11; Double-crested Cormorant, 8; Pelagic Cormorant, 1; Great Blue Heron, 3; Mallard, 200; Pintail, 200; Green-winged Teal, 2; Canvas-back, 26; Scaup Duck, 47; Am. Golden-eye, 7; Bufflehead, 19; Harlequin Duck, 1; White-winged Scoter, 9; Surf Scoter, 42; Am. Scoter, 35; Ruddy Duck, 1; Red-breasted Merganser, 5; Sharp-shinned Hawk, 1; Bald Eagle, 1; Coot, 1; Glaucous-winged Gull, 134; Herring Gull, 1; Short-billed Gull, 25; California Murre, 1; Marbled Murrelet, 1; Kingfisher, 4; Flicker, 6; Pileated Woodpecker, 1; Steller's Jay, 6; Crow, 46; Black-capped Chickadee, 36; Winter Wren, 1; Bewick's Wren, 2; Varied Thrush, 2; Townsend's Solitaire, 1; Golden-crowned Kinglet, 6; Ruby-crowned Kinglet, 1; English Sparrow, 1; Meadowlark, 1; Brewer's Blackbird, 300; Purple Finch, 1; Pine Siskin, 150; Spotted Towhee, 2; Junco, 36; Song Sparrow, 9. Total, 47 species, 1420 individuals. Western Grebe, 1 dead bird. Black Brant heard on Boundary Bay. — Frances Holdom, E. E. Woodford, M. W. Holdom.

Courtenay-Comox, Vancouver Island, B.C. — Dec. 26. 9 a.m. to 4.30 p.m.; cloudy; calm; temp. 40° F.; recent weather mild but stormy. Common Loon, 2; Pacific Loon, 2; Red-throated Loon, 3; Holboell Grebe, 12; Horned Grebe, 2; Pied-billed Grebe, 1; Double-crested Cormorant, 3; Pelagic Cormorant, 3; Mallard,

100; Baldpate, 850; Canvasback, 2; Scaup Duck, 140; Am. Golden-eye, 150; Barrow's Golden-eye, 8; Bufflehead, 35; White-winged Scoter, 1000; Surf Scoter, 125; American Scoter, 25; Hooded Merganser, 2; Am. Merganser, 25; Red-breasted Merganser, 4; Marsh Hawk, 1; Pheasant, 10; Coot, 10; Black Turnstone, 30; Glaucous-winged Gull, 700; Herring Gull, 3; Short-billed Gull, 87; Marbled Murrelet, 2; Belted Kingfisher, 1; Flicker, 3; Hair-

Woodpecker, 3; Downy Woodpecker, 3; Steller's Jay, 9; Raven, 1; Crow, 250; Chestnut-lacked Chickadee, 15; Bewick's Wren, 3; Winter Wren, 6; Golden-crowned Kinglet, 16; Ruby-crowned Kinglet, 11; English Sparrow, 40; Western Meadowlark, 3; Redwinged Blackbird, 1; Brewer's Blackbird, 1600; Purple Finch, 12; Spotted Towhee, 6; Junco, 40; Song Sparrow, 21. Total, 49 species. — A. R. Davidson, Theed Pearse.

BEAVER ON THE NORTHERN BRITISH COLUMBIAN ISLANDS¹

By T. T. McCABE

Berkeley, California

OWING to pressure of work I failed to include in the general faunal section of our recent paper on *Peromyscus maniculatus macrorhinus* (McCabe and Cowan, 1945) certain first hand information on the status and habits of the beaver on the islands between Queen Charlotte's Sound and Dixon Entrance. The habitat is so peculiar and, as beaver country, so atypical, and the tenure of the beaver at the moment so precarious, that a brief account may be warranted.

Of the three islands, Calvert, Princess Royal, and Aristazabal, where I have found them, the beaver population of the first had been reduced near to extermination, a process which may now be complete. Between April and July of 1937 I spent much time on the rocky open muskegs of the southwestern part of the island, studded with gnarled and weatherbeaten dwarf jackpine, and was amazed at the number of ancient dams which filled the innumerable winding rivulets which wander across them from the mountains to the outside coast. Likewise the single large creek which rises in two main forks near the southeastern shore, behind Safety Cove, had been heavily dammed between the three lakes through which it passes on the way to its outlet on the southwest, at Rocky Bay. These dams had not been added to for several years, but were still solid and had to be carried over. Those of the small rivulets of the open muskeg, mostly north of the lakes, were older. I saw no fresh sign, but found a few sticks on the Second Lake which had been cut and eaten the previous fall.

Just before World War I an unfortunate group of German colonists had been dropped in the middle of this fascinating but unproductive swamp. Their tenure was interrupted by the war when only three of the half-dozen cabins approached completion. They are known to have brought out considerable numbers of beaver pelts and it is probable that most of the too-easily accessible population was taken by them. Most years a group of Indians land at Safety Cove and cross the island by the lakes to Rocky Bay, near which there is an ancient smoke house. This is not in the trapping season, however, and as far as I can ascertain B.C. outer-coast Indians today have little interest in beaver, but devote their much diminished trapping activities almost entirely to beach-trapping of mink, from fishing boats.

A single half-Indian with headquarters at Namu certainly trapped Calvert for beaver for many years after the German colonists' occupation, and held down the decimated population. Wild cattle which the Germans left and which thrived amazingly until exterminated by shooting about 1932, were an additional incentive to visits by casual white trapper-fishermen. None the less, although quite convinced of the complete extermination I was amazed to find fresh beaver work, in the summer of 1939, at the opposite end of the island, by a stagnant pond not far from the blind arm of Kwakshua Pass. This was the more surprising in that beaver sign on the north end of the island, especially in the rivulets of the broad meadows between Kwakshua and the mountain ridge, though found years before, had then been very

¹) Received for publication January 2, 1947.

ancient. Although there is very definite information on the swimming of broad salt channels by deer and by wolves, I have never been able to gather evidence that beaver do so, though it is likely enough.

Sticks from the dams in the region of the lakes were mostly *Pinus contorta*, as were the few cut stumps which were found, but the fresh cutting near Kwakshua was Western Hemlock (*Tsuga heterophylla*). Willow is almost absent from the islands and alder rare at the points in question and showed no sign of having been taken. The question of food for the large old-time beaver population was a mystery to anyone with inland training. I had, indeed, never before seen beaver at so great a distance from continuous timber. The animals were evidently all "bank" beaver if indeed they used permanent shelter at all, which, considering the climate, was very doubtful. No lodge or cache was seen.

Subsequent experience on Princess Royal Island relieved me from further doubt on the food question. I had for a long time been hearing of the number of beaver which were supposed to exist on Princess Royal and of several footloose white men who lived on small boats and trapped beaver near various creek-mouths. There had been notorious feuds between them, and much burning of cabins, the remains of which I have seen. I had also found beaver sign and dams, though very ancient, along the drainage above the little anchorage at Hague Point in the mouth of Laredo Inlet, on the same island. Mr. Roy Tapp, caretaker of the ruined pulp mill which had been started in 1912 on the mainland side of Graham Reach, and who was my host through the spring of 1938, was kind enough to tell me of a good colony which he had registered at the head of the north fork of Soda Creek which drains into the junction of Tolmie Channel and Graham Reach.

When I reached the fork of the stream, however, I was more attracted by the main branch, which headed straight into the island. This I followed to the height of land and some distance down the opposite drainage to Bromfield Inlet. At the summit was the usual large open muskeg from which several deep and muddy channels drained to eastward, to form Soda Creek. At first sight of this area, I thought I had found an Indian village, for an acre of ground was gleaming with scattered billets of newly peeled western

hemlock. There were two newly-built or recovered lodges, half a dozen new and many old dams, and what seemed to be the remnant of one cache. It must be remembered that this was a high, cold, mountainous, site, of the character of the headlands rather than of the outer islands, in strong contrast to outer Calvert. I saw two beaver, and fresh scent piles were everywhere. I have seldom, anywhere in the north, seen so large and active a colony. After my experience on the coast the numbers alone were to be marvelled at, but the most striking fact was that all the food available and in use was simply hemlock. At various points on the big muskeg there were, for the latitude, extremely large alder trees which I suspect of being *A. oregana* (*A. rubra*) though all my collections from the district proved to be *A. sinuata*. These, as far as they went, would have been expected to be first choice, but not a trunk bore a tooth cut. The reason was evident upon investigation. This large species, for all its lush appearance and immense leaves, possesses a thin, hard bark, hardly a millimeter deep to the wood, totally unlike that which so often in the interior furnishes a food third only in preference to *Populus tremuloides* and *Salix*.

There is small chance that the beaver population of Princess Royal will ever be reduced to the extent of that of Calvert, as the island is too rugged and mountainous. This great colony owed its existence to the fact that the outer-coast trapper seldom goes far from his boat, —the trapping tradition is very different from that of the interior. But the important lesson is that the beaver are quite capable of thriving in numbers on the coniferous flora. In fact, such food is vastly more abundant and universal than that of the interior and the beaver in consequence less tied down to favourable spots.

This is probably a chief reason why it is far more difficult to be sure of the absence even of an animal which leaves such distinct and abundant sign, as illustrated by their unexpected re-discovery on Calvert, and their even more unexpected appearance on Aristazabal. I had covered a large part of the north end of this large island, between Borrowman Harbor and Kettell Inlet on the outside and the cluster of hillocks the charts call the Knight Range on the northeast, and would have been ready to swear no beaver

were present. Yet on returning to Borrowman Harbor by a devious route from the north I chanced on a small lake where for an hour I watched two beaver swimming about and nipping off the large green buds of the yellow pond lilies (*Nymphaea polysepala*). I had seen many such cut stalks, but never a stick, a scent-pile, a bank-cutting, or a track. I have no other information for Aristazabal but the vaguest of Indian reports.

The other islands listed in McCabe and Cowan as containing beaver, — Porcher, Pitt,

Macauley, Banks, Campania, Swindle, and the Hunters, — mostly depend on more or less dependable hearsay, and the populations, if indeed still present, are to be expected to be at a low ebb. But the purpose of these sadly sporadic notes is to bring out the fact that, in spite of the forbidding appearance of the vegetation there is every reason to believe that with protection large stands might maintain themselves on islands at least as small as Macauley, Swindle, or Campania.

FURTHER PROOF THAT *SPHAERIUM OCCIDENTALE* DOES NOT ATTAIN FULL GROWTH IN ONE YEAR¹

By H. B. HERRINGTON

Newburgh, Ont.

IN MY PREVIOUS PAPER "Does *Sphaerium occidentale* mature in one season?" (Can. Field-Nat. Vol. 58, No. 1, Jan. and Feb., 1944, pp. 6-7) I sought to show from the "rest" marks and from the fact that "Since juveniles of various sizes were in a state of resting in September; and, again, juveniles of similar sizes were living and active at least as early as April," that full growth was not attained in one year.

On Aug. 22, 1944, I began an experiment to secure further proof. I went to a swamp four miles N.N.W. of Newburgh, Camden Twp., Lennox and Addington County. My notes about the previous day's collecting here state, "We have had over three weeks of intensively hot weather, with but little rain, yet they (the clams) appeared to be in good condition." Of course they were in a resting state. I secured fifty juveniles and marked them on the ventral edge with a fine file. Some collapsed in the process. As I marked them I let them drop at a low spot within a radius of 12 inches in their accustomed habitat.

On July 3, 1945, I revisited this station, which I had carefully marked, and by scratching among the leaves, in a radius of 30 inches from the stake, I secured some 200 to 300 adult shells. Among these I found seven live specimens — but no empties — that were undoubtedly of those I had marked.

On June 19, 1946, I returned again. This time I was thorough. I collected all the

leaves and mud (for the swamp was not yet dry) for ½ inch in depth, after this manner: I made two concentric circles; the first from the stake to 36 inches; the second from 36 to 72 inches. I gathered all the debris of the first circle, but had pails for only half the second circle.

From this part of the outer yard I secured only one marked shell — an empty. The growth had been so abnormal after the marking that the ventral margin was bent over at the center — as was the case of three of those found in 1945. No clam with such a twisted ventral margin survived the second winter after marking.

In the area of the first yard from the stake seven of the shells found were clearly marked — about two others (live ones) there might be some question so we leave them out of consideration. Of these seven, five were alive when collected; one, if not alive, had but recently died for at the time of writing some of the dried animal still clings to the shell; the other, by the discoloration of the shell and the fact that there was only one growth period after being marked, is shown to have died in the fall of 1945. (In all, then, I have 15 out of the 50 shells I marked — 7 found in 1945 and 8 in 1946).

What about the 'rest' periods indicated on the shell? Of the seven clams found in 1945 (one year after marking) after the file mark each showed continuous growth to the ventral edge without any 'rest' periods. One of the seven showed a definite 'rest' period between

¹) Received for publication January 16, 1947.

the nepionic shell and the marking. This looks as though this clam had already had a rest, perhaps wintered over from the previous fall — the juveniles marked varied somewhat in size.

Of the six specimens which survived the winter of 1945-6 (2 years after marking) five had a growth space after the marking, a 'rest' period, and then another growth space extending to the ventral edge. One had four growth spaces after the mark with three 'rest' periods.

But for this last specimen we might conclude that the 'rest' periods were yearly growth marks, but this specimen would indicate that some clams are aroused from the period of rest by heavy rains, perhaps in the fall, have a period of growth and then rest again when frozen up for the winter — just as I have picked wild raspberries here in Newburgh in October when there is a warm, wet, fall.

It might be of interest to know that in this inner circle (of the 1946 collecting), with a diameter of six feet, I collected at this one time 2536 shells, little and big, including empties — but not single valves — by actual count. This was in an area from which I had already taken some 200 to 300 adults the year previous.

Comparing the marked shells collected in June, 1946, with the other shells of this station I would conclude that most of the *Sphaerium occidentale* Prime in this swamp survive at least two winters, and some survive three winters — i.e. one of the juveniles may have already survived a winter before being marked; and most of the marked shells would need the next summer's growth to have the diameter and 'rest' marks of a goodly number of the other shells.

TRADITION IN BIRD LIFE^{1 2}

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BIRD BANDING has proved that birds of many species are strongly inclined to return to, and nest in, the same locality in successive breeding seasons. The literature bearing on this point is too extensive and the fact so well known that substantiating references unnecessary.

The question as to whether yearling birds return to their natal site as breeding birds, has not been so fully answered. One might suspect that territorial and food competition would tend to produce scattering; to cause first-year breeders to drift away from their natal site. Pertinent data on this matter accumulate slowly, in part because there is heavy mortality among young birds. However, recent papers show a building up of evidence, at least with respect to certain species, that there is a tendency for young birds to return as yearlings, either to the site of their nativity, or to a place to which they were conditioned as juveniles. To illustrate the former, Farner (Bird-Banding, 16: 81-97) has shown that 86.9 per cent of young robins (387 out of 428) returning north for the breeding season, became established within twenty-

five miles of their natal site; in fact, when all doubtful records were deleted, the figure was 89 per cent. The only factor which might have produced exaggeration in these figures was the chance of detection which was better near an operated banding station. To illustrate a return of a yearling to a conditioning site, not to a natal site, Packard (Bird-Banding, 18: 30-31) reports a young robin which returned to a place where it had been kept as a pet which was sixty-four (plus) miles from its natal site.

There would appear to be something in the suggestion that continuous and protracted associations in the juvenile period builds a bond between an animal and its environment. In establishing a colony of the sedentary, feral pigeon, in a new and previously unoccupied situation, it is common practice to confine juveniles of an age capable of flight in a loft-compartment possessing a glass window. The birds are fed and watered in this situation for ten days or two weeks before giving them their liberty. Following such procedure, they are inclined to make this, or adjacent compartments, their home. If given their liberty too early, they are much more

¹) Received for publication February 4, 1947.

²) A paper presented to the Brodie Club, Toronto.

apt to drift and establish a home elsewhere. Apparently, widening the experience of a young animal widens the scope of its choice in establishing a home, or conversely, limiting its experience restricts its choice.

A number of stimuli and controls play a part in the migratory travels of a bird. Some inherent force impels it to move from one region to another; some faculty or faculties guide it on its way; lastly, something akin to tradition takes over and plays a final role. One might say that tradition aims the more automatic machinery of migration, and the spot of natal or conditioned experienced is the target.

I have used the word "tradition" in the absence of a better word. My dictionary says, a tradition is that which is handed down from ancestor to posterity. I use it to mean the magnetism of place for an individual, be it a blindly automatic response or otherwise. The connotation in the word "home" expresses the abstraction I have in mind. The place-tradition of a bird population would of course be lost with the elimination of the individuals involved.

I have noticed in my own and adjacent gardens that one or more pairs of robins, or flickers, become established in a certain situation for nesting. For two or three years they nested in the same or in adjacent situations, then ceased to do so. The tradition of using my neighbour's garage, or my verandah or bird box, was lost, possibly because the individual birds had run their life span. It has been a matter of surprise to me to find how long it sometimes takes before a tradition of occupancy is re-established by other individuals of common species, even though the environment has not changed perceptibly.

Tradition may become established with respect to place, other than for nesting. One or both of a pair of sparrow hawks has come regularly to the inner back court of the Royal Ontario Museum building in mid-winter to roost, preen, and eat their prey. It has become traditional with these birds (presumably the same ones) to resort to this place at this season, for four consecutive years. I suspect that if both of these birds were to die, it would be a long, long time before this particular pocketed situation would be the resort of this species.

A similar case of established tradition in the non-breeding season has to do with a screech owl which roosted in winter in a na-

tural cavity in a red maple near my office window. We can be reasonably sure that it was the same individual which came nearly every year for about eight years, because its plumage was the rare intermediate between the grey and red phase. The removal of the tree two years ago destroyed that tradition.

That the tradition of occupancy of a particular abode can be established artificially has already been mentioned in connection with the robin and the common pigeon. Perhaps the best example is afforded by the black duck population in the Toronto region. When Toronto was Muddy York, black ducks probably inhabited the border of the marshes along the Don and Humber and the lake-front bays, at least in summer. After the city grew and sprawled out over the land, and man thoroughly upset conditions, the tradition among black ducks to occupy the Toronto region in summer was pretty well lost. Furthermore, I dare say that any naturalist appraising the scene in 1930 as to its suitability as a wild duck habitat would have concluded that it was hopelessly inadequate and sterile. Yet the introduction and cultivation of a mongrel flock of black ducks at Sunnyside in the fall of 1931 has had surprising results. Hundreds of feral black ducks and numbers of mallards (four to one) now winter in the Toronto region and many of them now nest in summer along the Don and Humber, and about the little Kettle Lakes of the Toronto region.

That they are largely the "posterity" of mongrel ancestors is undoubted but in all probability they have decoyed wild drifters from other areas. It is of particular interest to note that all the requirements for these birds are found within and about a big city. Bread and grain thrown to them at Sunnyside may help sustain them in winter, but such is not essential since hundreds feed regularly in the open waters of the Don and seem quite independent of hand-feeding. Incidentally, it would be interesting to know what food materials they obtain in the Don!

It is possible through artificial means to establish the tradition of nesting in a particular area in the case of some species, though the population involved remains migratory. In Prince Edward County mallards were cultured by farmers on a small scale and released. Their progeny now nest regularly along the marshes, and even about farmyards, in

summer. They leave in autumn and return in spring.

This brings me to the two principal suggestions underlying my remark:

1st. That a given area may be quite suited to a particular species but is unoccupied either because the tradition of tenure has been lost, or was never established.

2nd. That wildlife managers and Game Departments may well look into the possibilities of filling up suitable but empty niches with certain desirable native species, establishing the tradition of tenure artificially. In addition there is always the possibility that unsuitable situations can be made suitable.

I am aware that the innumerable lakes of our north do not constitute a system of suitable duck ponds. The slow disintegration of pre-Cambrian rock is probably one basic cause for the paucity of ducks over much of our northland. The idea that black-flies, as vectors of disease, have limited the dispersal of these birds over the pre-Cambrian shield may be important with some species, but probably not with species now sporadically distributed through the northeast. I suggest that there may be innumerable scattered situations where black ducks could now exist, areas which are suitable but where there is no tradition of tenure to fill them. Botanists and invertebrate zoologists could readily make an estimate of existing food resources of such places.

If the eggs of black ducks from adjacent areas were artificially incubated and the ducklings hand-reared, released and conditioned to an apparently suitable but vacant

area, we have good reason to believe they would return to the area as breeding birds. Deliberate cultivation for a few years might well duplicate the Toronto experience. If a substantial colony was once established it would constitute a reservoir for further application of the method.

In presenting these suggestions I have no idea of lending support to the practice of introducing exotics into our land. I am primarily concerned with the feasibility of boosting the general population of certain desirable native species. My greatest chance of error in the suggestions made, would seem to be in supposing that an environment, empty of certain species, could continuously support a significant population. In describing the black duck situation at Toronto I have presented some evidence that unoccupied territory does not necessarily indicate unsuitability. There are other cases which support the point in some respects. For example, for historic and geological reasons the starling and the ring-necked pheasant never occupied the North American environment. We no longer need proof that they *can* live here. It is my thesis that possibly there is far more space in Ontario suitable for native birds than is used by native birds. If we wait until natural events bring about the tradition of tenure, we may wait a long time. Bird pioneers, that is drifters which might establish tradition, are probably products of over-population. Few game birds enjoy this status these days. In conclusion, and without discussion, it is desirable to add, that limiting factors working against migratory populations of birds may not be in the summer range, indeed they may be in some other part of the hemisphere.

BOOK REVIEWS

Annual Report of the Province of Quebec Society for the Protection of Birds, Inc., for 1946. Montreal, pp. 1-44.

The 1946 activities of the Society are reviewed. There is an excellent summary of bird observations made during 1946 in the Montreal region compiled by L. McI. Terrill (pp. 6-38). This contains many local migrational and distributional data, usually identifies the observer, and frequently compares the 1946 local status of a given species with that of preceding years. — W. EARL GODFREY.

Habeeb, H., 1945. **An Addition to the Birds of Beechmont.** *Acadian Naturalist*, 2, No. 5, p. 43. A bald eagle in Fredericton. — A. L. RAND.

Hoar, W. S., 1945. **Repair of fractured deer bones.** *Acadian Naturalist*, 2, No. 5, pp. 44-46. Describes and illustrates two examples, a tibia and a humerus from specimens of *Odocoileus americanus* (= *O. virginianus*) from New Brunswick. — A. L. RAND.

Munro, J. A. 1947. **Observations of Birds and**

Mammals in Central British Columbia. Occasional Papers of the B. C. Prov. Mus. No. 6, 165 pp.

Would that more of our naturalists prepared and published the results of their work in such a fashion; and would that they could see and record as much. The area covered in this report is from near Quesnel in the south to near Prince George and Hazelton in the north; the investigations were carried out in the summer of 1944. There is an itinerary, map, description of areas visited, and annotated lists of birds and mammals observed and collected. The annotations are very full, with particular reference to population sizes of game and fur animals.

One interesting point brought out is the probable migration route of the red-breasted sapsucker which appears to reach this part of central British Columbia from the coast, migrating in spring north west of the mountains, then east and south. Though no taxonomy is included, some unusual combinations of bird names are used without explanation. The forms of *Branta canadensis* occurring are cited as three species: the old name *Grus mexicanus* is used for the sandhill crane, while *Grus canadensis* appears as another species; and *Sphyrapicus ruber* is kept as a distinct species.

In the mammal section the population data includes trap night returns, and information from the records of the fur trade, bounty payment, and from conversations with trappers, data that are often neglected, but should be routine in any faunal report.

The trapping of fur is one of the chief industries in the area, and is a full time occupation for a large number of people. — A. L. RAND.

THE 1945 STATUS OF THE PRONGHORN ANTELOPE, ANTILOCOPRA AMERICANA (ORD), IN CANADA. By A. L. Rand; *National Museum of Canada, Bulletin No. 106, Biological Series No. 34, Ottawa, 1947; 25c.*

This paper gives the most complete account of the status of the antelope in Canada that has ever been published. Some 16 population units, some large and some small, are described and there are notes on other possible groups. The population estimate is 29,406 head, considered to be conservative. The status of the species, after analysis of the history, trends and pertinent factors is considered good, as of 1945. — C. H. D. CLARKE.

Ekland, Carl R., 1946. **Fur Resources Management in British Columbia**, Jour. Wildlife Management, 10, pp. 29-33.

A summary of the trap line system and its operation in British Columbia. Trap lines have been in effect for 19 years and are almost universally esteemed. There are now about 5,300 trap lines in the province, of which about 3,000 are held by Indians; no limit on size is laid down, but the Game Commission uses its discretion. About 90% of the province's 366,000 square miles can be trapped, and whites trap about 50-60% of it. The fur take of 9 species for the period 1926-1942 is given, and the fluctuations over the years are surprisingly small. It is interesting to note that in the war years covered (up to 1942) there was not a great fall off in the fur take, and the royalties collected in 1942 total more than in any previous year listed.

Most individual trappers make \$1,000 a year; some better ones make \$2,000 and \$3,000 a year, working for six months. One man, by improving his trap line — beaver ranching in effect — was able to take \$10,000 worth of fur, mostly beaver, in 1942-43. The total average animal value of the fur take to the trappers is estimated at about \$1,750,000.

The system, giving one man the fur rights on an area makes for conservation and most trappers desire to build up their fur populations and to crop off only the surplus. — A. L. RAND.

Squires, W. A., 1945. **The James S. Lord Collection of Birds' eggs.** *Acadian Naturalist*, 2, No. 5, pp. 67-80. In 1937 the ornithological material collected by Lord was given to the New Brunswick Museum. The eggs, which the present paper lists, comprised 415 sets, 272 of them from New Brunswick, the others acquired by exchange from elsewhere. The collection includes the eggs collected by J. W. Banks of Saint John. For 100 species there are listed the sets with the number of eggs, the date, place and collector. The quantitative data listed here, as to clutch size and breeding dates is valuable. The qualitative data is more doubtful, as the breeding record of the white-rumped sand-piper (2 sets of eggs from St. John) that can hardly be accepted on this evidence. — A. L. RAND.

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No. 2

INTRODUCED PLANTS OF WATERLOO AND ADJACENT COUNTIES, ONTARIO

F. H. MONTGOMERY,
Kitchener, Ont.

THE EXPANSE of our country is great. It embraces many life zones, and a compilation of the known organisms living in such a vast region would be impossible, or, at least, a Herculean task. Therefore, it is necessary to piece together our knowledge of its life little by little, and hope eventually to get a pattern of the whole. This survey of Waterloo and adjacent counties, presents another small part of the pattern, and, it is hoped, a useful one.

The study of the flora of Waterloo County originated with a scrutiny of the plants collected by the late William Herriot, in the vicinity of Galt, chiefly between 1889 and 1900 ²⁾, and the collections made by the writer during the last ten years over the whole county, to which additions are being made constantly. In the various herbaria visited, during the search for materials from Waterloo, fairly complete assemblages of plants were noted for Wentworth County to the south ³⁾, and Huron County to the north-west and adjoining Wellington County. In 1941 Stroud ⁴⁾ listed the flora of Wellington County to the east, and Krotkov, 1940 ⁵⁾, published his explorations in the Bruce Peninsula, which is contiguous with Huron County. Thus there was available information on the flora from the tip of Lake Ontario to Georgian Bay, and it was decided to expand the work, and compare the flora of Waterloo County with the above-named areas.

The present work includes only the introduced species of this area ⁶⁾. In the main plant list, (Waterloo list), annotations for distribution and localities have been made only for those collections from Waterloo County, since the writer is familiar with most of the localities indicated. Unfortunately, many labels gave indefinite locations and no indications of habitats, therefore, for some, general statements are the best that can be made. The writings of Herriot have been quoted freely where his records alone are available for this county, and such quotations are noted throughout the text. The presence of the plants in other counties is indicated by the county name. In the second list, species not found in Waterloo are given.

Throughout the listings there has also been a note made regarding the source of these plants. I have chosen to give their original home, as far as possible, rather than their source of introduction since such might be interpreted as their origin of local importation, and this would be difficult to determine.

Many sources of information have been examined in order to make the lists as complete as possible, but the most important of these are the herbaria of The University of Toronto, The Ontario Agricultural College, The University of Western Ontario, Queen's University, McMaster University, The Division of Botany and Plant Pathology, The National Museum of Canada, and The Herriot Collection.

I wish to express my sincere thanks to those in charge of the above-named herbaria, for permission to search for materials, and for their many other courtesies. I particu-

¹⁾ Received for publication November 14, 1946.

²⁾ The Herriot collection is now in the custody of Mr. Monroe Landon, Simcoe, Ont.

³⁾ The main collections are the property of the Hamilton Association, and housed in the herbarium of McMaster University.

⁴⁾ Stroud, J. (1941): A Study of the Flora of Wellington County, Ontario; Can. Field-Nat. 55: 56-62; 73-76; 85-88; 104-107.

⁵⁾ Krotkov, P. V. (1940): Botanical Explorations in the Bruce Peninsula, Ontario; Trans. of the Royal Can. Institute, Vol. 23, Pt. I.

⁶⁾ For a study of the indigenous plants of the same region see, Montgomery, F. H. (1945): A Botanical Survey of Waterloo County, Ontario; Trans. Royal Can. Institute; pp. 217-265.

larly extend my appreciation to Dr. H. A. Senn and his associates of the Division of Botany and Plant Pathology, who checked most of my determinations, and helped in many other details of this work. To Dr. L. O. Gaiser of McMaster University, I am especially indebted for her great interest, extensive help, suggestions and encouragement throughout my investigations.

The botanical names used are those given in Gray's New Manual of Botany (1908). Where there is known to have been nomenclatural revision the more recent one is given and the name in Gray's Manual is indicated in parenthesis. Common names, as far as possible, are those of Gray's Manual, otherwise the name used in Britton and Brown, Illustrated Flora of the Northern States and Canada has been chosen.

Much difference of opinion exists among authorities as to whether certain species are indigenous, introduced, or both, and in compiling the lists the following references have been consulted:

1. Britton, N. L. and Brown, A. (1913): An Illustrated Flora of the Northern States and Canada, (2nd. Edition); Charles Scribner's Sons, New York.
2. Clark, G. H. and Fletcher, J., (1909): Farm Weeds of Canada, (2nd Edition); Dom. Dept. of Agriculture.
3. Deam, C. C. (1940): Flora of Indiana; Dept. of Conservation, Div. of Forestry, Indianapolis, Indiana.
4. Groh, Herbert: Canadian Weed Survey, 1942, 1943, 1944; Dom. Dept. of Agriculture, Science Service, Division of Botany and Plant Pathology, Ottawa.
5. Muenscher, W. C., (1936): Weeds; Mac-Millan & Co., New York.
6. Robinson, B. L. and Fernald, M. L. (1908): Gray's New Manual of Botany (7th. Edition); American Book Co., New York.
7. Rydberg, P. A., (1932): Flora of the Prairies and Plains of Central North America; The New York Botanical Garden, New York.
8. Victorin, Frère Marie, (1935): Flore Laurentienne; Imprimerie de la Salle, Rue Côté, Montréal.
9. Wiegand, K. M., and Eames, A. J., (1925): The Flora of the Cayuga Lake Basin; Cornell Agric. Exp. Station, Mem. 82.

In addition to the information from the herbarium of the Hamilton Association the following publications on the flora of Wentworth County were studied:

Buchan, J. M., (1874): Notes on the flora of Hamilton; The Can. Jour. Series II, Vol. 14, pp. 281-304.

Craigie, Dr. W. and W. Jr., (1853-1854): List of the indigenous plants found in the neighbourhood of Hamilton; The Can. Jour. Vol. 2, pp. 222-223.

Logie, A., (1861): List of plants found in the neighbourhood of Hamilton; Annals of the Bot. Soc. of Can. Vol. 1, pp. 90-108.

LIST OF SPECIES GRAMINEAE

Agropyron repens (L.) Beauv.

COUCH. Common in gardens, fields, and waste places. — Wentworth, Wellington, Bruce Pen. — Nat. of Eurasia.

Agrostis alba L.

RED TOP. Common everywhere. — Wentworth, Wellington, Huron. — Nat. of Eurasia.

Anthoxanthum odoratum L.

SWEET VERNAL GRASS. Collected in woods near Galt ?). — Wentworth, Wellington, Huron. — Nat. of Eurasia.

Arrhenatherum elatius (L.) Beauv.

TALL OAT GRASS. Collected by Herriot ?) 1901, 1903, near Galt. — Wellington. — Nat. of Eu.

Avena fatua L.

WILD OATS. Occasional along roadsides and waste places ?). — Wellington, Huron, Bruce Pen. — Nat. of Eu.

Avena sterilis L.

ANIMATED OATS. A specimen collected by Herriot 1901, is in the herbarium of the Division of Botany and Plant Pathology.

Bromus brizaeformis Fisch. & Mey.

RATTLESNAKE BROME. Collected by John Macoun in 1901 near Galt, but has not been recorded since. Nat. of Europe.

Bromus inermis Leyss.

SMOOTH BROME. First collected in 1939 along railroad tracks and waste ground. — Wellington. — Native from Central Europe to China.

Bromus racemosus L.

UPRIGHT CHESS. Collected by Herriot ?) south of Galt, 1902. — Wellington, Bruce Pen. — Nat. of Eurasia.

Bromus secalinus L.

CHEAT or CHESS. Frequent along roadsides and in waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Bromus tectorum L.

DOWNY BROME GRASS. All of our speci-

?) Herriot W. (1908): The grasses of Galt, Ontario, and vicinity; Ont. Nat. Sci. Bull., pp. 126-132.

mens were collected along railroad tracks. — Wellington. — Nat. of Eu.

Cenchrus pauciflorus Benth.

C. carolinianus Walt. BUR GRASS⁸). My 1946 collection on railroad ballast south of Galt is the first record for this county.

Wentworth, Wellington. — Mass. to Oreg. southward to Fla., Tex. and N. Mex.

Cynosurus cristatus L.

DOG'S TAIL GRASS. Observed growing in lawns at Galt⁷). — Wellington, Huron. — Adv. from Eu.

Dactylis glomerata L.

ORCHARD GRASS. Widely distributed. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

Digitaria Ischaemum (Schreb.) Muhl.

D. humifusa Pers. SMALL CRAB GRASS. Found in cultivated fields and waste places⁷). — Wentworth, Wellington, Huron. — Nat. of Eurasia.

Digitaria sanguinalis (L.) Scop.

LARGE CRAB GRASS, FINGER GRASS. Frequent in waste places and cultivated fields. — Wentworth, Wellington. — Nat. of Eu.

Eragrostis poaeoides Beauv.

BARNYARD GRASS. Found widely spread along roadsides, railway tracks and waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of the Old World.

Eragrostis cilianensis (All.) Link.

E. megastachya (Koeler) Link. STINK or SNAKE GRASS. Collected on the campus of Kitchener Collegiate. Commonly seen in cultivated ground and waste places. — Wellington. — Nat. of Eu.

Eragrostis poaeoides Beauv.

E. minor Host. LOW ERAGROSTIS. Collected by Groh at Preston and Hespeler in 1932, and by Herriot⁷) at Galt 1910. Nat. of Eu.

Festuca elatior L.

TALLER or MEADOW FESCUE. Common along roadsides and along flats of the Grand R. — Wellington, Wentworth, Huron, Bruce Pen. — Nat. of Eurasia.

Festuca ovina L.

SHEEP FESCUE. May be indigenous northward. Herriot⁷) reported this as common along roadsides, fields and waste places 1894. — Wellington, Bruce Pen. — Stroud also reports var. *duriuscula* (L.) Koch in Wellington county. — Nat. of Eu.

Festuca rubra L.

RED FESCUE-GRASS. May be native farther

north. Found around the former Dickson Estate at Galt, 1901⁷). — Wellington.

Lolium perenne L.

PERENNIAL RYE or RYE GRASS, COMMON DARNEL. Found occasionally on lawns and roadsides⁷). — Wentworth, Wellington, Huron. — Nat. of Eu.

Panicum miliaceum L.

EUROPEAN MILLET. Occasionally found along roadsides and railway tracks. — Wellington. — Nat. of the Old World.

Phalaris canariensis L.

CANARY GRASS. Occasionally found around towns⁷) — Wellington, Huron. — Nat. of the Mediterranean Region.

Phleum pratense L.

TIMOTHY. Common in waste and cultivated ground. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

Poa annua L.

LOW SPEAR GRASS. Common in waste places and cultivated ground. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Poa compressa L.

CANADA BLUE GRASS. Common over the county. — Wentworth, Wellington, Bruce Pen. — Nat. of Eu.

Poa nemoralis L.

WOOD MEADOW GRASS. Collected in open woods. Wiegand and Eames (9) say that a somewhat distinct form of this species is native in the far north and the far west. Clarke and Malte (2) note that "The Canadian species is found in meadows, along borders of woods and prairies; the introduced species will not thrive in the open." — Wellington, Bruce Pen.

Poa pratensis L.

JUNE GRASS, KENTUCKY BLUE GRASS. Native in more northern areas and also introduced according to Deam (3). Common everywhere. — Wentworth, Wellington, Huron, Bruce Pen.

Poa trivialis L.

ROUGH-STALKED MEADOW GRASS. Collected by Herriot⁷) along the Grand R., 1901. — Nat. of Eu.

Puccinellia distans (L.) Parl.

SPREADING MEADOW FESCUE GRASS. Collected by Herriot⁷) on waste heap at Forbes Mill, Hespeler 1901. — Wellington — Naturalized from Eurasia and N. Africa.

Setaria italica (L.) Beauv.

FOXTAIL MILLET. Collected along roadsides 1901⁷). — Wellington, Bruce Pen. — Nat. of Eurasia.

⁸) W. G. Dore informs me that he has records for Leamington and Toronto for this species.

Setaria lutescens (Weigel) F. T. Hubb.

S. glauca (L.) Beauv. FOXTAIL, PIGEON GRASS. Frequent on roadsides and cultivated ground. — Wentworth, Wellington. — Nat. of Eu.

Setaria verticillata (L.) Beauv.

BRISTLY FOXTAIL. Collected by Herriot ?) in Galt 1908. — Wellington. — Nat. of Eu.

Setaria viridis (L.) Beauv.

GREEN FOXTAIL GRASS. Common along roadsides and in cultivated ground. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

COMMELINACEAE

Commelina communis L.

COMMON DAY-FLOWER. This species was just recently collected in a dry woods about 1½ miles south of Kitchener. — Nat. of E. Asia.

LILIACEAE

Allium Schoenoprasum L.

CHIVE. Found occasionally as an escape. — Wellington. — Nat. of Eu.

Asparagus officinalis L.

GARDEN ASPARAGUS. Frequent escape throughout the county. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Muscari botryoides (L.) Mill.

GRAPE HYACINTH. My specimen collected along the Conestoga R. — Wellington, Huron. — Nat. of Europe.

IRIDACEAE

Iris pseudacorus L.

YELLOW IRIS. One clone of this beautiful Iris was found along the millrace at Cone-stoga. — Nat. of Europe.

ORCHIDACEAE

Epipactis Helleborine (L.) Crantz.

Serapias Helleborine L. BROADLEAF EPI-PACTIS. Collected in dry woods near Kitchener, October 1946. — Wentworth. Also collected in Halton County near Campbellville, October 1946. — Probably from Europe.

SALICACEAE

Populus alba L.

WHITE POPLAR. Frequent along roadsides. — Wentworth, Wellington, Bruce Pen. — Nat. of Eurasia.

Salix alba L.

WHITE WILLOW. Collected by Herriot in vicinity of Galt 1903. — Nat. of Eu.

Salix purpurea L.

PURPLE WILLOW. Collected on Cowan's farm near Galt 1904. — Nat. of Eu.

BETULACEAE

Betula populifolia Marsh.

WHITE, GRAY or OLD FIELD BIRCH. This is being considered as introduced, since the specimen was collected beside the old mill-race in the city of Galt, and has not been reported elsewhere. — Wellington. — Its distribution is given as N.S., to s. Ont., southw. to Del. and Pa.

MORACEAE

Cannabis sativa L.

HEMP. Frequently found in towns and along the Grand R. — Wentworth, Wellington, Huron. — Nat. of Asia.

Humulus Lupulus L.

COMMON HOP. Occasional escape along roadsides near habitation. — Wellington, Bruce Pen. — Nat. of Eurasia.

Morus alba L. var. *tatarica* (L.) Loud.

WHITE MULBERRY. Found occasionally along roadsides and edges of woods. — Wentworth, Wellington. — Probably introd. from Russia.

URTICACEAE

Urtica dioica L.

STINGING NETTLE. Collected along edge of cultivated field. — Nat. of Eu.

Urtica urens L.

DOG NETTLE. My specimens found along edge of moist woods. — Probably of European origin.

POLYGONACEAE

Fagopyrum esculentum Moench.

BUCKWHEAT. Found usually as individual plants scattered over the county. Not persistent. — Wentworth, Wellington, Bruce Pen. — Nat. of Eu.

Polygonum aviculare L.

KNOT-GRASS, DOOR-WEED. Considered to be native to America and also introduced. Common along roadsides and in yards. — Wentworth, Wellington, Huron, Bruce Pen.

Polygonum Convolvulus L.

BLACK BINDWEED. Climbing over fences and bushes frequently. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Polygonum Hydropiper L.

(Including var. *projectum* Stanford.) COMMON SMARTWEED or WATER PEPPER. May be native and also introduced. Common in marshy ground. — Wentworth, Wellington, Huron.

Polygonum lapathifolium L.

DOCK-LEAVED or PALE PERSICARIA. May be native or introduced. Frequent along edges of rivers and lakes. — Wentworth, Wellington, Huron, Bruce Pen.

Polygonum Persicaria L.

LADY'S THUMB. Common in cultivated fields, waste places and along water courses. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Rumex Acetosella L.

SHEEP SORREL. Widely distributed in old fields and roadsides. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Rumex crispus L.

CURLED DOCK. Common along roadsides, river-flats and abandoned fields. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Rumex obtusifolius L.

BITTER or BROAD-LEAVED DOCK. In moist ground and along roadsides. — Wellington, Huron, Bruce Pen. — Nat. of Eu.

CHENOPODIACEAE

Chenopodium album L.

LAMB'S QUARTERS, PIGWEED. Deam (3) states that there are some specifically American races found, in addition to the truly European races. Widely distributed over the county. — Wentworth, Wellington, Huron, Bruce Pen.

Chenopodium Botrys L.

JERUSALEM OAK. FEATHER GERANIUM. Reported by Herriot in Galt, 1893. — Wentworth, Wellington, Huron. — Nat. of Eurasia.

Chenopodium glaucum L.

OAK-LEAVED GOOSEFOOT. This may be native in some places westward, but it is apparently introduced in this area. Not frequent. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Chenopodium urbicum L.

CITY GOOSEFOOT. Collected once in Galt, 1895. — Wentworth, Wellington. — Nat. of the Old World.

Chenopodium Vulvaria L.

STINKING GOOSEFOOT. Collected by Herriot, 1897, at Galt. — Nat. of Eu.

Salsola pestifer A. Nelson.

S. Kali L. var. *tenuifolia* G. F. W. Mey.
RUSSIAN THISTLE. Common in cultivated ground and waste places. Not reported in the early years of the century. — Wellington, Bruce Pen. — Nat. of Asia.

AMARANTHACEAE

Amaranthus blitoides Wats.

PROSTRATE AMARANTH. Common along roadsides and in cultivated ground. — Wellington. — Nat. of drier regions of western America.

Amaranthus hybridus L.

GREEN AMARANTH. PIGWEED. Common

in cultivated ground and waste places. — Wellington. — Nat. of the tropics.

Amaranthus graecizans L.

TUMBLE WEED. Collected by Herriot at the Doon Pinnacle 1901. — Wentworth, Wellington, Huron, Bruce Pen. — Native in western America.

Amaranthus lividus L.

PURPLISH AMARANTH. One collection near Galt 1902. — Nat. of Tropical America.

Amaranthus retroflexus L.

ROUGH GREEN AMARANTH, PIGWEED. Widely distributed. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Tropical America.

NYCTAGINACEAE

Oxybaphus nyctagineus (Michx.) Sweet.

HEART-LEAVED UMBRELLA-WORT. My 1945 collection is the first record for this region. Native to the middle western States.

PORTULACACEAE

Portulaca oleracea L.

COMMON PURSLANE. Groh (4), 1944, states that this was formerly believed to be indigenous to the southwestern States, but more recent writers seem to favour its introduction from Europe. Very common in gardens and cultivated fields. — Wentworth, Wellington, Huron, Bruce Pen.

CARYOPHYLLACEAE

Agrostemma Githago L.

CORN COCKLE. Found occasionally in pasture fields. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

Arenaria serpyllifolia L.

THYME-LEAVED SANDWORT. Common along roadsides, railroad tracks and waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

Cerastium arvense L.

FIELD MOUSE-EAR CHICKWEED. This is native to some parts of America, but it is also introduced in many places. Frequent along our rivers. — Wentworth, Wellington, Bruce Pen.

Cerastium vulgatum L.

(Including var. *hirsutum* Fries.) **COMMON MOUSE-EAR CHICKWEED.** Common along roadsides, railroad tracks. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

Lychnis alba Mill.

WHITE COCKLE or CAMPION. Common in waste places and in fields, often being mistaken for *Silene noctiflora* or Night-flowering

Catchfly. — Wentworth, Wellington. — Nat. of Eu.

Saponaria officinalis L.

SOAPWORT, BOUNCING-BET. Very common along roadsides and along river-flats. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Saponaria Vaccaria L.

COW-HERB. Found in waste places around Galt. — Wentworth, Wellington. — Nat. of Eu.

Scleranthus annuus L.

KNAWEI. Collected at Veitch's Lake, near Galt 1902, and New Hamburg 1899. — Nat. of Eu.

Silene Cucubalus Wibel.

S. latifolia (Mill.) Britten & Rendle. BLADDER CAMPION. A common weed along roadsides and in cultivated fields. — Wentworth, Huron, Bruce Pen. — Nat. of Eu.

Silene noctiflora L.

NIGHT-FLOWERING CATCHFLY. Common in waste places and in fields. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Spergula arvensis L.

CORN SPURRY. Found in cultivated fields near Galt, 1902. — Wellington. — Nat. of Eu.

Stellaria graminea L.

LESSER STARWORT, STITCHWORT. Victorin (8) claims that this may be indigenous in the north. Other authorities consider it as introduced from Europe. Common in moist grassy places. — Wellington, Bruce Pen.

Stellaria media (L.) Cyril.

COMMON CHICKWEED. Most authorities agree on the introduction of this species from Europe. Very common in gardens, fields. — Wentworth, Wellington, Huron, Bruce Pen.

RANUNCULACEAE

Ranunculus acris L.

TALL BUTTERCUP. Common all over the county along roadsides and in waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

BERBERIDACEAE

Berberis vulgaris L.

EUROPEAN BARBERRY. Particularly common along our river-banks and occasionally along the edges of woods. — Wentworth, Wellington. — Nat. of Eu.

PAPAVERACEAE

Chelidonium majus L.

GREATER CELANDINE. Common in woods, shaded roadsides and river-banks. — Wentworth, Wellington, Bruce Pen. — Nat. of Eu.

FUMARIACEAE

Fumaria officinalis L.

COMMON FUMITORY. Herriot reported this as an occasional weed in gardens, 1913⁹⁾. — Nat. of Eu.

CRUCIFERAE

Alyssum alyssoides L.

SMALL ALYSSUM. Common along railroad tracks, roadsides and waste places. — Wellington. — Nat. of Eu.

Arabis glabra (L.) Bernh.

TOWER MUSTARD. Considered by some as indigenous, by others as introduced. Found occasionally in fields and along the banks of the Grand R. — Huron, Bruce Pen.

Armoracia rusticana Gaertn.

Radicula Armoracia (L.) Robinson. HORSE-RADISH. Occasionally found along roadsides near farmyards. — Wellington, Bruce Pen. — Nat. of Eu.

Barbarea vulgaris R. Br.

BITTER WINTER CRESS, YELLOW ROCK-ET. Native in north and west, but apparently introduced into eastern America. Common in fields and in moist places. — Wentworth, Wellington, Bruce Pen.

Berteroa incana (L.) DC.

HOARY ALYSSUM. Occasionally found in the southern part of the county. Usually widespread where it does occur. — Wellington. — Nat. of Eu.

Brassica juncea (L.) Cosson.

INDIAN MUSTARD. Found along railroad tracks in the vicinity of Galt, 1902. — Wellington. — Nat. of Asia.

Brassica Kaber (DC.) Wheeler var. pinnatifida (Stokes) Wheeler.

B. arvensis (L.) Rabenhorst. CHARLOCK. Found in cultivated fields. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Brassica nigra (L.) Koch.

BLACK MUSTARD. Collected by Herriot in 1893 at Galt.—Wellington.—Nat. of Eurasia.

Camelina microcarpa Andr.

SMALL-SEEDED FALSE FLAX. Common in cultivated ground and waste places. — Wentworth, Wellington. — Nat. of Eu.

Capsella Bursa-pastoris (L.) Medic.

SHEPHERD'S PURSE. Common in gardens, cultivated fields and waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Cardaria Draba (L.) Desv.

Lepidium Draba L. HOARY CRESS, WHITE-

⁹⁾ Herriot, W. (1913). The crowfoot and poppy families and their allies around Galt, Ontario; Ont. Nat. Sci. Bull., pp. 40-46.

TOP. Found a number of years ago near Galt, but not recently collected. — Wellington. — Nat. of Asia.

Diploxaxis muralis (L.) DC.

SAND ROCKET. All of our specimens have been collected by Groh in the vicinity of Preston and Galt, 1932 and 1940. — Introduced from Eu.

Diploxaxis tenuifolia (L.) DC.

WALL ROCKET. Found frequently along the Grand R., and along roadsides. — Wellington, Bruce Pen. — Nat. of Eu.

Eruca sativa Mill.

ROCKET SALAD. Found in a number of places in 1908 and 1909, but has not been collected since. — Wellington, Huron.

Erucastrum gallicum (Willd.) O. E. Schulz.

DOG MUSTARD. Collected by Groh at Preston 1928, and Galt 1932, along railroad tracks. — Wellington. — Nat. of Eu.

Erysimum cheiranthoides L.

WORM-SEED MUSTARD. Native in some parts of America, but also introduced in many localities. Common in gardens, fields, roadsides. — Wentworth, Wellington, Huron, Bruce Pen.

Lepidium campestre (L.) R. Br.

FIELD PEPPERGRASS. Very abundant throughout the county. — Wentworth, Wellington, Bruce Pen. — Nat. of Eu.

Lepidium densiflorum Schrad. var. **typicum** Thellung.

L. apetalum Willd. PEPPERGRASS. Common along roadsides, fields, and waste places. — Wentworth, Wellington, Bruce Pen. — Nat. of Eurasia.

Nasturtium officinale R. Br.

Radicula Nasturtium-aquaticum (L.) Britten & Rendle. WATER-CRESS. Common along streams. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

Rorippa sylvestris (L.) Bess.

Radicula sylvestris (L.) Druce. CREEPING YELLOW CRESS, YELLOW FIELD CRESS. Found frequently along the flats of rivers. — Wellington. — Nat. of Eurasia.

Sisymbrium altissimum L.

TUMBLE MUSTARD. Found along roadsides, railroad tracks, and cultivated fields. — Wentworth, Wellington, Bruce Pen. — Nat. of Eu.

Sisymbrium officinale (L.) Scop.

Including var. **leiocarpum** DC. HEDGE MUSTARD. Frequent along roadsides and in fields. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Thlaspi arvense L.

FIELD PENNY CRESS, STINKWEED. River-flats and occasionally in fields. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

CRASSULACEAE

Sedum acre L.

MOSSY STONECROP. Common along the roadsides in the southern part of this county, where the limestone comes close to the surface or is exposed. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

ROSACEAE

Fragaria vesca L.

STRAWBERRY. May be native and also introduced. Widely distributed over the county. — Wentworth, Wellington, Huron.

Malus pumila L.

COMMON APPLE. Commonly found as isolated trees throughout the county. — Wellington, Bruce Pen. — Nat. of Eu. and w. Asia.

Potentilla Anserina L.

SILVER WEED. Victorin (8) claims that this exists as an indigenous plant around the Gulf of St. Lawrence and along water courses. Very common along our rivers. — Wentworth, Wellington, Bruce Pen.

Potentilla argentea L.

SILVERY CINQUEFOIL. This may be native in some regions, but it is also introduced from Europe in many localities, according to Muenscher (5). Common in waste places and on roadsides. — Wentworth, Wellington, Huron, Bruce Pen.

Potentilla monspeliensis L.

ROUGH CINQUEFOIL. Some forms or varieties of this species appear to be native. Frequent along roadsides, fences and around buildings. — Wentworth, Wellington, Huron, Bruce Pen.

Potentilla recta L.

SULPHUR CINQUEFOIL. Common along roadsides and in uncultivated fields. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Prunus Cerasus L.

SOUR or MORELLA CHERRY. Collected along the Grand R., 1940, south of Galt. — Nat. of Eu.

Prunus Mahaleb L.

PERFUMED CHERRY. Escaped from cultivation in a few places¹⁰⁾. — Nat. of Eu.

¹⁰⁾ Herriot W. (1912); The Rosaceae and Leguminosae of Galt, Ontario and vicinity; Ont. Nat. Sci. Bull; pp. 28-34.

Prunus spinosa L.

BLACKTHORN. One collection by Herriot near Galt, 1909¹⁰). — Nat. of Eu.

Rosa micrantha Borrer.

SMALLFLOWER SWEETBRIER. Only one collection near St. Clements, 1940. — Wentworth. — Nat. of Eu.

Rosa rubiginosa L.

SWEETBRIER. Frequent along roadsides, fences, and edges of woods. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Sanguisorba minor Scop.

GARDEN BURNET. My 1946 collection is the first record for this county. It was growing in great profusion over a large area on a sandy hill near Centreville. — Wellington. — Nat. of Eu.

Sorbus Aucuparia L.

Pyrus Aucuparia (L.) Ehrh. EUROPEAN MOUNTAIN ASH. Frequently found along the banks of Grand R. and occasionally elsewhere. — Wellington. — Nat. of Eurasia.

LEGUMINOSAE**Anthyllis Vulneraria L.**

KIDNEY VETCH. Collected by Groh in Lucerne at Preston. — Wellington. — Introd. from Eu.

Gleditsia triacanthos L.

HONEY LOCUST. The Herriot collection has one specimen collected in Galt. The next nearest record is for Hamilton. It is doubtful that our specimen is indigenous.

Lathyrus latifolius L.

EVERLASTING or PERENNIAL PEA. An occasional escape along roadsides. — Wellington. — Nat. of Eu.

Lotus corniculatus L.

BIRD'S-FOOT TREFOIL. Found occasionally in old clover fields. — Wellington. — Nat. of Eurasia.

Medicago hispida Gaertn.

BUR CLOVER. Collected by Groh near Preston, 1917. — Nat. of Eu.

Medicago lupulina L.

BLACK MEDIC. Common in lawns, fields and roadsides. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

Medicago sativa L.

ALFALFA. A common escape. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Melilotus alba Desr.

WHITE SWEET CLOVER. Common along roadsides and in abandoned fields. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

Melilotus officinalis (L.) Lam.

YELLOW SWEET CLOVER. Commonly found mixed with the previous species. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

Robinia Pseudo-Acacia L.

COMMON LOCUST. Widely distributed in the southern part of the county but not so common northward. — Wentworth, Wellington, Huron, Bruce Pen. — Introd. from more southern areas.

Robinia viscosa Vent.

CLAMMY LOCUST. An infrequent escape from cultivation¹⁰). — Wellington. — Introd. from southern areas.

Trifolium agrarium L.

YELLOW or HOP CLOVER. Much more common here than *Trifolium procumbens* which it closely resembles. — Wentworth, Bruce Pen. — Nat. of Eu.

Trifolium dubium Sibth.

SUCKLING CLOVER. Collected at only one locality near Galt, 1902¹⁰). — Wellington, Bruce Pen. — Nat. of Eu.

Trifolium hybridum L.

ALSIKE CLOVER. A common escape. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Trifolium pratense L.

RED CLOVER. Common in fields, lawns, and along roadsides. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

Trifolium procumbens L.

LOW HOP CLOVER. Occasional in fields and waste places¹⁰). — Wentworth, Wellington. — Nat. of Eu.

Trifolium repens L.

WHITE CLOVER. Common in fields, lawns and along roadsides. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

Vicia angustifolia (L.) Reichard and var. *segetalis* (Thuillier) Koch.

COMMON VETCH. Common along roadsides, railroad tracks and in old clover fields. — Wellington. — Nat. of Eu.

Vicia Cracca L.

TUFTED VETCH. May be native and also introduced. Common along roadsides, railroad tracks and waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

GERANIACEAE**Geranium pusillum Burm. f.**

SMALL-FLOWERED CRANE'S-BILL. Collected in Galt 1892 by Herriot. — Wellington, Huron. — Nat. of Eu.

LINACEAE***Linum usitatissimum* L.**

COMMON FLAX. Frequently found as isolated plants. — Wentworth, Wellington, Huron. — Nat. of Eu.

RUTACEAE***Ruta graveolens* L.**

COMMON RUE. Collected by Groh at Hesper on a gravel bank, 1937. — Nat. of Eu.

EUPHORBIAEAE***Euphorbia corollata* L.**

FLOWERING SPURGE. May be both native and introduced. Found occasionally in the southern part of the county. — Wentworth, Huron. — Apparently more southern in its distribution.

***Euphorbia Cyparissias* L.**

CYPRESS SPURGE. Common along roadsides and railroad tracks. — Wellington, Huron, Bruce Pen. — Nat. of Eu.

***Euphorbia Esula* L.**

LEAFY SPURGE. Occasional in waste places and along railroad tracks. — Wellington, Huron. — Nat. of Eu.

***Euphorbia Helioscopia* L.**

WARTWEED. Collected once near Galt, 1908. — Wentworth, Wellington, Bruce Pen. — Nat. of Eu.

***Euphorbia Peplus* L.**

PETTY SPURGE. Occasional in flower beds and waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

RHAMNACEAE***Rhamnus cathartica* L.**

COMMON BUCKTHORN. Frequent along Grand R. banks. — Wellington, Huron. — Nat. of Eu.

***Rhamnus Frangula* L.**

GLOSSY BUCKTHORN. Very common in some marshes around Galt. — Wellington. — Nat. of Eu.

MALVACEAE***Malva moschata* L.**

MUSK MALLOW. Frequent along roadsides, fields and edges of woods. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Malva neglecta* Wallr.**M. rotundifolia* of authors.** COMMON MALLOW. Common along roadsides, in lawns, gardens and fields. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.***Sida spinosa* L.**

PRICKLY SIDA. Found by Herriot along the Grand R. 1894. — Nat. of the tropics.

GUTTIFERAE (HYPERICACEAE)***Hypericum perforatum* L.**

COMMON ST. JOHN'S WORT. Common along roadsides, and in abandoned fields. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

VIOLACEAE***Viola arvensis* Murr.**

WILD PANSY. Found occasionally in abandoned fields. — Wentworth, Wellington. — Nat. of Eu.

LYTHRACEAE***Lythrum Salicaria* L.**

PURPLE or SPIKED LOOSESTRIFE. Common along water-courses. — Wellington. — Nat. of Eu.

UMBELLIFERAE***Carum Carvi* L.**

CARAWAY. Common along roadsides and waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

***Daucus Carota* L.**

WILD CARROT, QUEEN ANNE'S LACE. Widely distributed. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

***Imperatoria Ostruthium* L.**

MASTERWORT. Found along edge of a dam near Blair. — Of European origin.

***Pastinaca sativa* L.**

WILD PARSNIP. Frequently found in marshy ground. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

PRIMULACEAE***Lysimachia Nummularia* L.**

MONEYWORT. Common along the river-flats. — Wellington, Huron. — Nat. of Eu.

APOCYNACEAE***Vinca minor* L.**

COMMON PERIWINKLE, "MYRTLE". Frequently found along roadsides, near houses and cemeteries. — Wentworth, Wellington. — Nat. of Eu.

CONVOLVULACEAE***Convolvulus arvensis* L.**

FIELD BINDWEED, WILD MORNING-GLORY. Common along roadsides, railroad tracks and waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

BORAGINACEAE***Cynoglossum officinale* L.**

COMMON HOUND'S TONGUE. Common along edges of woods and in waste places. — Wentworth, Wellington, Bruce Pen. — Nat. of Eu.

***Echium vulgare* L.**

BLUE-WEED, VIPER'S BUGLOSS. A bad

weed along roadsides, railroads, river-flats and waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Lappula echinata Gilibert.

STICKSEED. Frequent along railways, roadsides and waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

Lithospermum arvense L.

CORN GROMWELL. Common along railroads and waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

Lithospermum officinale L.

COMMON GROMWELL. Found along roadsides and railroad tracks. — Wentworth, Huron. — Nat. of Eu.

Myosotis micrantha Pall.

One collection by Herriot in woods near Galt, 1907. — Wellington. — Of European origin.

Myosotis scorpioides L.

TRUE FORGET-ME-NOT. Herriot collected a specimen at Galt, 1909. — Wentworth. — Nat. of Eu.

Symphytum officinale L.

COMMON COMFREY. Occasionally found along water courses and roadsides near habitation. — Wentworth, Wellington, Huron. — Nat. of Eu.

LABIATAE

Galeopsis Tetrahit L.

COMMON HEMP NETTLE. Our specimens have been collected along the Grand R. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Glechoma hederacea L.

Nepeta hederacea (L.) Trev. **GROUND IVY, GILL-OVER-THE-GROUND.** Common along the flats of our rivers and streams. — Wentworth, Wellington, Huron. — Nat. of Eu.

Lamium amplexicaule L.

HENBIT, DEAD NETTLE. Collected by Groh in gardens at Preston and Hespeler. — Wentworth, Wellington. — Nat. of Eurasia.

Lamium maculatum L.

SPOTTED DEAD NETTLE. Collected at Hespeler by E. W. Hart. — Huron, Bruce Pen. — Of European origin.

Lamium purpureum L.

PURPLE DEAD NETTLE. One collection made along the Roseville Road near Galt, 1901. — Nat. of Eurasia.

Leonurus Cardiaca L.

COMMON MOTHERWORT. Frequent along river-flats and edges of woods. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Marrubium vulgare L.

COMMON HOREHOUND. Found in Galt, 1892, by Herriot. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Mentha piperita L.

PEPPERMINT. Frequent along river-flats. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Mentha spicata L.

SPEARMINT. Frequent along roadsides and river-flats. — Huron. — Nat. of Eurasia.

Nepeta Cataria L.

CATNIP. Common throughout the county. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eurasia.

Prunella vulgaris L.

HEAL-ALL. Frequently found on lawns in Kitchener. It attains a height of 2 or 3 inches and becomes prostrate and roots at the nodes. Flower heads are much smaller than our native variety *lanceolata* (Bart.) Fern. — Nat. of Eu.

Salvia pratensis L.

MEADOW SAGE. Collected by Stone near Conestoga, 1936. — Nat. of Eu.

Salvia sylvestris L.

WOOD SAGE. Common along the river-flats. — Wellington. — Nat. of Eurasia.

Satureja Acinos (L.) Scheele.

SPRING SAVORY. Found occasionally. — Wellington, Bruce Pen. — Of European origin.

SOLANACEAE

Datura Stramonium L.

STRAMONIUM, JIMSON WEED. Found around towns, but does not persist. — Wentworth, Wellington, Huron. — Nat. of tropical regions.

Physalis pruinosa L.

STRAWBERRY TOMATO. Collected by Groh at Kitchener, 1936. More southern in its distribution.

Solanum Dulcamara L.

BITTERSWEET, CLIMBING NIGHTSHADE. This has been considered as introduced from Europe and Asia, but Deam (3) considers that it is native, at least in Indiana. It is common in all damp areas. — Wentworth, Wellington, Huron, Bruce Pen.

Solanum nigrum L.

COMMON NIGHTSHADE. Apparently some forms of this species are native to North America. Common in our open woods. — Wentworth, Wellington, Huron, Bruce Pen.

SCROPHULARIACEAE

Chaenorrhinum minus (L.) Lange.

Linaria minor (L.) Desf. **SMALL SNAP-**

DRAGON. Found most frequently along railroad tracks. — Wellington, Huron, Bruce Pen. — Nat. of the Mediterranean region.

Linaria Cymbalaria (L.) Mill.

KENILWORTH or **COLISEUM IVY.** Collected by Herriot in the vicinity of the tannery at Galt, 1892. — Huron, Bruce Pen. — Of European origin.

Linaria vulgaris Hill.

BUTTER AND EGGS, TOADFLAX. Common along roadsides, railroads and in waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Mimulus moschatus Dougl.

MUSK FLOWER. Considered as both native and introduced in the east. Found near moist woods.

Pentstemon Digitalis Nutt.

P. laevigatus var. *Digitalis* (Sweet) Gray.

SMOOTH PENSTEMON, FOXGLOVE, BEARD-TONGUE. Muenscher (5) states that the northward distribution has been from Pennsylvania. It is found in abandoned fields. — Wellington, Huron.

Verbascum Blattaria L.

MOTH MULLEIN. More frequent in the southern part of the county, along roadsides and in abandoned fields. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Verbascum Thapsus L.

COMMON MULLEIN. Common along roadsides and in abandoned fields, particularly in sandy areas. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Verbascum Anagallis-aquatica L.

WATER SPEEDWELL. Frequent in creeks and ponds. — Wentworth, Huron, Bruce Pen. — Nat. of Eurasia.

Veronica arvensis L.

CORN SPEEDWELL. May be native in some sections of North America as well as being introduced. Frequent in cultivated ground, lawns and waste places. — Wentworth, Wellington, Huron, Bruce Pen.

Veronica officinalis L.

COMMON SPEEDWELL. Native and also introduced. Common along edges of woods and in open woods. — Wentworth, Wellington, Huron.

Veronica serpyllifolia L.

THYME-LEAVED SPEEDWELL. Native and also introduced. Found in moist ground throughout the county. — Wentworth, Wellington, Huron, Bruce Pen.

PLANTAGINACEAE

Plantago aristata Michx.

LARGE-BRACTED PLANTAIN. May be in-

troduced from the mid-western States, or it may be one of several western species that appear to extend eastward into this county. Not common.

Plantago lanceolata L.

RIBGRASS, ENGLISH PLANTAIN. Common in lawns, gardens, roadsides and waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Plantago major L.

COMMON PLANTAIN. Probably native northward. Roadsides, lawns, farmyards and waste places. Frequently confused with *P. Rugelii* Dcne. — Wentworth, Wellington.

RUBIACEAE

Galium Aparine L.

CLEAVERS, GOOSE-GRASS. May be native and also introduced. Our specimens found in open woods and edges of woods. — Wentworth, Wellington, Huron, Bruce Pen.

Galium Mollugo L.

WILD MADDER. Found along roadsides near Waterloo. — Wellington, Huron, Bruce Pen. — Nat. of Eu.

Galium verum L.

YELLOW BEDSTRAW. Common along railroads and roadsides. — Wellington, Huron. — Nat. of Eu.

CAPRIFOLIACEAE

Lonicera tatarica L.

TATARIAN HONEYSUCKLE. Common in marshes, along roadsides, river-flats and edges of woods. — Wentworth, Wellington, Bruce Pen. — S. Russia to Altai and Turkestan.

VALERIANACEAE

Valeriana officinalis L.

GARDEN HELIOTROPE. Found once along the edge of moist woods near St. Clements. — Wellington. — Nat. of Eu.

DIPSACACEAE

Dipsacus sylvestris Huds.

WILD TEASEL. Common along river-flats and in old fields. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu. and Asia.

CAMPANULACEAE

Campanula rapunculoides L.

CREEPING or EUROPEAN BELLFLOWER. Found along roadsides. — Wentworth, Wellington. — Of European origin.

Campanula Trachelium L.

NETTLE-LEAVED BELLFLOWER. Collected along the edges of woods around Galt. — Nat. of Eurasia.

COMPOSITAE

Achillea Millefolium L.

COMMON YARROW, MILFOIL. May be native and introduced in some localities. Common

everywhere. — Wentworth, Wellington, Huron, Bruce Pen.

Anthemis arvensis L.

CORN CHAMOMILE. Collected at Preston by Groh, 1924. — Nat. of Eu. and the Orient.

Anthemis Cotula L.

MAY-WEED, DOG FENNEL. Common along roadsides and in farmyards. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu., Africa and the Orient.

Arctium minus (Hill) Bernh.

COMMON BURDOCK. Common along roadsides, around old buildings and along edges of woods. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Artemisia Absinthium L.

ABSINTH WORMWOOD. My collections were made along the Grand R. south of Bridgeport. — Bruce Pen. — Introduced from the west.

Artemisia biennis Willd.

BIENNIAL WORMWOOD. Found along railways and in waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Native of western America.

Artemisia frigida Willd.

PASTURE SAGEBRUSH. Herriot¹¹⁾ reported this as an occasional plant along the Canadian Pacific Railroad. — Wellington. — A native of the west.

Artemisia vulgaris L.

COMMON MUGWORT, WORMWOOD. Herriot¹¹⁾ remarks that this was occasional. It is now fairly common, particularly along the Grand R. — Wellington, Bruce Pen. — Native in western America.

Carduus crispus L.

CURLED THISTLE. Collected by Eastman and Howitt near Hespeler. — Wellington. — Of European origin.

Carduus nutans L.

MUSK THISTLE. Collected in an old pasture. — Wellington. — Nat. of Eu.

Centaurea Jacea L.

BROWN KNAPWEED. Occasional along roadsides and railroads. — Wellington. — Nat. of Eu. and Siberia.

Centaurea nigra L.

Including var. *radiata* DC. BLACK KNAPWEED. Found on rocky ground near Preston by McLeod and Groh, and along roadsides and railroad tracks more recently. — Wentworth, Wellington, Bruce Pen. — Of European origin.

Centaurea vochinensis Bernh.

TYROL KNAPWEED. Occasional. — Wellington. — Nat. of Eu.

Chrysanthemum Balsamita L. var. tanacetoides Boiss.

COSTMARY. Found occasionally¹²⁾. — Wentworth, Wellington. — Nat. of the Old World.

Chrysanthemum Leucanthemum L. var. pinatifidum Lecoq & Lamotte.

OX-EYE DAISY, WHITE DAISY. Common everywhere. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Cichorium Intybus L.

COMMON CHICORY. Common everywhere in the county. Along roadsides and waste places. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Cirsium arvense (L.) Scop.

CANADA THISTLE. Common everywhere. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Cirsium vulgare (Savi) Airy-Shaw.

C. lanceolatum (L.) Hill. COMMON or BULL THISTLE. Found along roadsides and in abandoned fields. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Crepis capillaris (L.) Wallr.

SMOOTH HAWKS-BEARD. Herriot¹¹⁾ collected this at Galt 1902. — Wellington, Huron. — Nat. of Eu.

Gaillardia aristata Pursh.

GREAT-FLOWERED GAILLARDIA. Collected by Herriot¹¹⁾ along a roadside south of Galt, 1898. — Wellington. — Of western origin.

Grindelia squarrosa (Pursh) Dunal.¹²⁾

GUM-PLANT; TAR-WEED. Found chiefly along roadsides and occasionally in fields¹¹⁾ — Wellington. — Of western origin.

Helianthus annuus L.

COMMON SUNFLOWER. An occasional escape. — Native westward.

Helianthus tuberosus L.

JERUSALEM ARTICHOKE. Apparently native and also introduced in many localities. Quite abundant in one place near Kitchener, which, according to some local authorities was a former Indian encampment. — Wellington, Bruce Pen.

12) Steyermark, Studies in Grindelia II. Ann. Missouri Bot. Gard. 21: 433-608. 1934, reported this from 31 of the 48 States, but from Canada, only one collection from St. Catharines, Ont. 1898. But it has been frequent in this country since 1902. Spotton and McIntyre, Elementary Botany, 1922, report it from the Ottawa, Stroud for Wellington, and the writer has observed it on many occasions along roadsides. Steyermark reported variety *serrulata* from Fort William and Winnipeg.

11) Herriot W. (1910); The Compositae of Galt, Ontario and vicinity. Ont. Nat. Sci. Bull. pp. 55-64.

Hieracium aurantiacum L.

ORANGE HAWKWEED, DEVIL'S PAINT-BRUSH. Common in abandoned fields. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Hieracium florentinum All.

KING DEVIL. Frequent in old fields. — Of European origin.

Hieracium vulgatum Fries.

HAWKWEED. Frequent along roadsides and railroad tracks. — Wellington. — Of European origin.

Inula Helenium L.

ELECAMPANE. Common along roadsides and river-flats. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Lactuca serriola L.

Including *f. integrifolia* Bogenhard. *L. scariola* L. and var. *integrata* Gren. & Godr. PRICKLY LETTUCE. Common in gardens, fields and along roadsides. — Wellington, Bruce Pen. — Nat. of Eu.

Lapsana communis L.

NIPPLE-WORT. Common in open woods and along borders of woods. — Wentworth, Wellington, Huron. — Of European origin.

Leontodon autumnalis L.

FALL DANDELION. Collected beside the fence of Kitchener Collegiate — Wentworth, Wellington, — Of European origin.

Leontodon hastilis L.

Common in one vicinity near Galt, 1902¹¹). — Of European origin.

Leontodon nudicaulis (L.) Banks.

ROUGH or HAIRY HAWKBIT. Collected in the vicinity of Galt, 1902¹¹). — Of European origin.

Matricaria inodora L.

SCENTLESS CHAMOMILE. Herriot¹¹) reported this as rare along roadsides in 1902. — Of Pacific Coast origin.

Matricaria matricarioides (Less.) Porter.

M. suaveolens (Pursh) Buchenau. PINEAPPLE-WEED. Common along roadsides and in farmyards. — Wellington, Bruce Pen. — Native to the Pacific coast.

Onopordum Acanthium L.

COTTON or SCOTCH THISTLE. Most frequently found along roadsides and in abandoned fields. — Wentworth, Wellington, Bruce Pen. — Nat. of Eurasia.

Rudbeckia hirta L.

YELLOW DAISY, BLACK-EYED SUSAN. Some writers claim that it is native only in the west, but Muenscher (5) states that it is native from western New York and Ont., south and southwest to Colorado and Texas.

Common along roadsides and in abandoned fields. — Wentworth, Wellington, Huron, Bruce Pen.

Senecio canus Hook.

SILVERY GROUNDSEL. Collected near Galt in the early years of the century¹¹). — Of western origin.

Senecio vulgaris L.

COMMON GROUNDSEL. Frequent in towns and along roadsides in the vicinity of woods. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Sonchus arvensis L.

FIELD SOW THISTLE. Common throughout the county. — Wentworth, Wellington, Bruce Pen. — Nat. of Eu.

Sonchus asper (L.) Hill.

SPINY-LEAVED SOW THISTLE. Distributed over the county but not as common as previous species. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Sonchus oleraceus L.

COMMON SOW THISTLE. Widely distributed throughout the county. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Tanacetum vulgare L.

COMMON TANSY. Common along roadsides, fences and river-banks. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Taraxacum palustre (Lyons) Lam. & DC. var. *vulgare* (Lam.) Fern.

T. officinale Weber. COMMON DANDELION. Common everywhere. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu. and Asia.

Tragopogon porrifolius L.

OYSTER-PLANT, SALSIFY. Common along roadsides and railroad tracks. — Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Tragopogon pratensis L.

GOAT'S BEARD. Found along with the previous species. Wentworth, Wellington, Huron, Bruce Pen. — Nat. of Eu.

Tussilago Farfara L.

COLTSFOOT. One collection made by M. Hertzog is in the O.A.C. herbarium, 1933. — Of European origin.

Xanthium spinosum L.

SPINY COCKLEBUR. One collection by Groh in 1917 at Preston. — Wentworth. — Nat. of Eu.

Introduced Species in Adjacent Counties.

In the following list is shown those species not occurring in Waterloo County, but found in the other areas under discussion. By far the greater number of these have been recorded in Wellington County, as reported by

Stroud, and this may be explained by the fact that the Ontario Agricultural College is located in that county, and emphasis has undoubtedly been given to the introduced plants. A survey of these shows that many may be of very localized occurrence and would in all probability be introduced in some of the other counties, but no collections have been made. An example might be quoted in *Acer platanoides* L., which has been introduced almost everywhere in the area as an ornamental, and might be collected by very few for that reason.

Abutilon Theophrasti Medic. Velvet Leaf, Indian Mallow. — Wentworth, Wellington. — Native of India.

Acer platanoides L. Norway Maple. — Wentworth, Wellington. — Of European origin.

Achillea Ptarmica L. Sneezweed. — Wellington. — Introduced from Europe.

Aegopodium Podagraria L. Goutweed. — Wellington. — Native of Europe.

Aesculus glabra Willd. Ohio Buckeye. — Wellington. — Probably introduced from further south.

Aesculus Hippocastanum L. Horse-chestnut. — Wentworth, Wellington, Bruce Pen. — Native of Asia.

Agropyron cristatum (Schreb.) Gaertn. Wellington. — Of European origin.

Agropyron Smithii Rydb. Blue-joint. — Wellington. — Native of prairies and plains.

Ajuga genevensis L. Bugle Weed. — Wellington. — Native of Europe.

Alchemilla vulgaris L. Lady's Mantle. — Wellington. — Of European origin.

Allium vineale L. Field Garlic. — Huron. — Native of Europe.

Alopecurus aequalis Sobol. — Wellington. — Probably of more northern distribution.

Alopecurus pratensis L. Meadow Foxtail. — Wellington. — Native of Europe.

Amaranthus paniculatus L. Purple Amaranthus. — Wentworth, Wellington, Huron. — Native of Tropical Regions.

Ambrosia coronopifolia T. & G. (*A. psilostachya* DC.) Western Ragweed. — Wellington. — Native westward.

Anagallis arvensis L. Common Pimpernel. — Wentworth, Wellington. — Nat. of Eurasia.

Anethum graveolens L. Dill. — Wellington. — Nat. of the Old World.

Anthemis tinctoria L. Yellow Chamomile. — Wellington. — Nat. of the Old World.

Antirrhinum majus L. Snap Dragon. — Wellington. — Of European origin.

Aquilegia vulgaris L. Garden Columbine. —

Huron, Bruce Pen. — Of European origin.
Argemone mexicana L. Mexican Prickly Poppy. — Wellington. — Nat. of Trop. Amer.
Aristolochia Clematitis L. Birthwort. — Wellington. — Native of Europe.

Aristolochia macrophylla Lam. Pipe Vine, Dutchman's Pipe. — Wellington. — Native southward.

Artemisia Abrotanum L. Southernwood. — Huron. — Nat. of S. Eu. and the Orient.

Artemisia ludoviciana Nutt. Western Mugwort, White sage. — Wentworth, Wellington. — More western in distribution.

Artemisia pontica L. Roman Wormwood. — Wellington, Bruce Pen. — Nat. of Europe.

Avena sativa L. Oats. — Wellington. — Nat. of Europe.

Axyris amaranthoides L. — Wellington. — Native westward.

Bellis perennis L. Daisy. — Wellington. — Native of the Old World.

Brassica hirta Moench. (*B. alba* (L.) Boiss.). White Mustard. — Wellington. — Of European origin.

Bromus arvensis L. Wellington. — Native of the Old World.

Bromus commutatus Schrad. — Wellington. — Native of Europe.

Bromus Pumpellianus Scribn. — Wellington. — Native westward.

Cabomba caroliniana Gray. Fanwort. — Wellington. — Native southward.

Camelina sativa (L.) Crantz. — Wellington, Huron, Bruce Pen. — Native of Europe.

Centaurea Cyanus L. Bluebottle, Bachelor's Buttons. — Wellington. — Nat. of Europe and the Orient.

Centaurea maculosa Lam. — Bruce Pen. — Native of Europe.

Centaurea montana L. — Wellington.

Centaurea Scabiosa L. — Wellington. — Nat. of Europe.

Centaurea solstitialis L. Barnaby's Thistle. — Wellington. — Native of Europe.

Cerastium viscosum L. — Wentworth. — Nat. of Europe.

Chenopodium ambrosioides L. Mexican Tea. — Wentworth. — Nat. of Tropical America.

Chenopodium Bonus-Henricus L. Good-King-Henry. — Wentworth, Wellington, Huron. — Of Old World origin.

Chrysanthemum Parthenium (L.) Bernh. Feverfew. — Wellington. — Nat. of Europe.

Chrysanthemum segetum L. Corn Chrysanthemum. — Wellington — Native of the Old World.

- Cleome serrulata* Pursh. Stinking Clover. — Wellington. — Native westward.
- Cleome spinosa* L. Spider-flower. — Wellington. — Native of the Tropics.
- Conium maculatum* L. Poison Hemlock. — Huron, Bruce Pen. — Native of Europe.
- Conringia orientalis* (L.) Dumort. Hare's-ear Mustard. — Wellington. — Nat. of Europe.
- Crataegus Oxyacantha* L. English Hawthorn. — Wellington. — Of European origin.
- Crepis tectorum* L. Narrow-leaved Hawk's Beard. — Huron. — Nat. of the Old World.
- Cycloloma atriplicifolium* (Spreng.) Coult. Winged Pigweed. — Wellington. — Probably from the west.
- Daphne Mezereum* L. Mezereum. — Wellington. — Of Old World origin.
- Descurainia Sophia* (L.) Wats. — Wellington. — Native of the Old World.
- Dianthus Armeria* L. Deptford Pink. — Wentworth, Wellington, Huron. — Of European origin.
- Dianthus barbatus* L. Sweet William — Bruce Pen. — Native of Europe.
- Dianthus deltoides* L. Maiden Pink. — Wellington. — Native of Europe.
- Digitalis purpurea* L. Foxglove. — Wellington. — Of European origin.
- Elusine indica* (L.) Gaertn. Goose Grass. — Wentworth. — Native of the tropics of the Old World.
- Epilobium hirsutum* L. — Wentworth, Wellington. — Native of Europe.
- Erodium cicutarium* (L.) L'Her. Storksbill. — Bruce Pen. — Nat. of Eu.
- Euphorbia platyphylla* L. Broad-leaved Spurge. — Wentworth. — Of European origin.
- Evonymus europaeus* L. European Spindle Tree. — Wellington. — Introd. from Eu.
- Fraxinus quadrangulata* Michx. Blue Ash. — Native of more southern areas.
- Galinsoga ciliata* (Raf.) Blake. Quickweed. — Wellington, Bruce Pen. — Nat. of Tropical America.
- Geranium pratense* L. — Wellington. — Of European origin.
- Helianthus rigidus* (Coss.) Desf. (*H. scaberrimus* Ell.). — Wellington. — Native westward.
- Hemerocallis fulva* L. Tawny Daylily. — Wellington. — Native of Eurasia.
- Hesperis matronalis* L. Dame's Violet. — Huron. — Nat. of Europe.
- Hibiscus Trionum* L. Flower-of-an-hour. — Wellington. — Native of Europe.
- Hieracium floribundum* Wimm. & Grab. — Wellington. — Nat. of Europe.
- Hieracium praealtum* Gochnat. — Wellington. Native of Europe.
- Holcus lanatus* L. Velvet Grass. — Wellington. — Native of Europe.
- Hypochaeris glabra* L. — Wellington. — Of European origin.
- Hypochaeris radicata* L. Cat's ear. — Huron. — Native of Europe.
- Hyoscyamus niger* L. Black Henbane. — Wentworth, Wellington. — Nat. of Europe.
- Hyssopus officinalis* L. Hyssop. — Wellington, Bruce Pen. — Nat. of Europe.
- Knautia arvensis* (L.) T. Coulter. — Wellington. — From Europe.
- Kochia Scoparia* (L.) Schrad. Kochia. — Wellington. — Of European origin.
- Lepidium rudemale* L. Narrow-leaved Peppergrass. — Wentworth. — Of Europ. origin.
- Lepidium sativum* L. Garden Cress. — Wellington, Bruce Pen. — Native of Europe.
- Ligustrum vulgare* L. Privet or Prim. — Wellington. — Nat. of Europe.
- Lithospermum incisum* Lehm. (L. angustifolium Michx.) Narrow-leaved Puccoon. 2 collections for Wentworth County. Native westward.
- Lobularia maritima* (L.) Desv. Sweet Alysum. — Wellington. — Nat. of Europe.
- Lolium multiflorum* Lam. Italian Ryegrass. — Wellington. — Nat. of Europe.
- Lolium temulentum* L. Bearded Darnel. — Wellington. — Native of Europe.
- Lonicera Morrowi* Gray. Wellington. — Of Asiatic origin.
- Lunaria annua* L. Honesty. Bruce Pen. — Of European origin.
- Lychnis chalcidonica* L. Scarlet Lychnis. — Wellington. — Nat. of Japan.
- Lychnis coronaria* (L.) Desr. Rose Campion, Mullein Pink. — Wellington, Bruce Pen. — Native of Europe.
- Lychnis dioica* L. Red Campion. — Wellington. Nat. of Eurasia.
- Lycium halimifolium* Mill. Common Matri-mony Vine. — Wellington. — Of European origin.
- Lycopsis arvensis* L. Small Bugloss. — Wentworth, Wellington. — Nat. of the Old World.
- Lycopus europaeus* L. Wentworth, Wellington. — Nat. of the Old World.
- Lysimachia punctata* L. Wellington. — Of European origin.
- Mahonia Aquifolium* (Pursh) Nutt. (*Berberis Aquifolium* Pursh.) Oregon Grapes. — Wellington. — Of western origin.

- Medicago falcata* L. Wellington. — Of European origin.
- Mollugo verticillata* L. Carpet weed. — Wellington, Huron. — Native southward.
- Monolepis Nuttalliana* (R. & S.) Wats. — Wellington. — Native westward.
- Myosotis versicolor* (Pers.) Sm. — Wellington. — Of European origin.
- Neslia paniculata* (L.) Desv. Ball Mustard. — Wellington, Bruce Pen. — Nat. of Europe.
- Nicandra Physalodes* (L.) Pers. Apple of Peru. — Wellington. — Nat. of South Amer.
- Nicotiana rustica* L. Wild Tobacco. — Wellington. — Of a doubtful origin.
- Origanum vulgare* L. Wild Marjoram. — Wellington, Huron. — Of European origin.
- Ornithogalum umbellatum* L. Star of Bethlehem. — Wentworth, Wellington, Bruce Pen. — Native of Europe.
- Oxalis repens* Thunb. — Wellington. — Nat. of the Tropics.
- Papaver Rhoeas* L. Corn Poppy. — Wellington. — Native of Europe.
- Phlox paniculata* L. Wellington. — More southern in its distribution.
- Phlox subulata* L. Ground or Moss Pink. It is doubtful that this is native as far north as Wellington County.
- Picea Abies* (L.) Karst. Norway Spruce. — Wellington. — Of European origin.
- Picris echioides* L. Ox-tongue. — Wellington. — Native of the Old World.
- Picris hieracioides* L. Wellington. — Native of the Old World.
- Pinus sylvestris* L. Scotch Pine. — Wellington. — Of European origin.
- Pisum sativum* L. Garden Pea. — Wellington. — Of European origin.
- Plantago media* L. Hoary Plantain. — Wellington, Huron. — Native of the Old World.
- Polemonium reptans* L. Creeping Polemonium, Greek Valerian. — Wellington. — More southern in distribution.
- Polygonum cuspidatum* Sieb. & Zucc. Japanese Knotweed. — Wellington. — Nat. of Japan.
- Populus candicans* Ait. Balm of Gilead. — Wellington. — Of doubtful origin.
- Populus nigra* L. Black Poplar. — Wellington. — Probably of European origin.
- Portulaca grandiflora* Hook. Garden Portulaca. — Wentworth. — Nat. of South Amer.
- Proboscidea louisiana*. Woot. & Stand. — Unicorn Plant. — Wellington. — More southern in its distribution.
- Ranunculus Ficaria* L. Lesser Celandine. — Wellington. — Native of Eurasia.
- Raphanus Raphanistrum* L. Wild Radish. — Wellington. — Native of Eurasia.
- Raphanus sativus* L. Radish. — Wellington. — Native of Asia.
- Ratibida columnifera* (Nutt.) Woot. & Standl. Long-head Coneflower. — Wellington. — Native westward.
- Ribes nigrum* L. Black Currant. — Wellington. — Of European origin.
- Ribes sativum* (Reichenb.) Syme. (R. vulgare Lam.) Red Currant. — Wellington. — Nat. of Europe.
- Rumex conglomeratus* Murr. Clustered or Smaller Green Dock. — Wellington. — Of European origin.
- Salix fragilis* L. Brittle Willow. — Wellington, Bruce Pen. — Nat. of Europe.
- Salvia Scleria* L. Clary. — Wellington. — Native of the Old World.
- Satureja hortensis* L. Summer Savory. — Wentworth, Huron. — Nat. of the Old World.
- Secale cereale* L. Rye. — Wellington. — From the Old World.
- Sedum Telephium* L. var. *purpureum* L. Garden Orpine, Live-for-ever. — Bruce Pen. — Native of Europe.
- Sempervivum tectorum* L. Hen-and-chickens. — Wellington. — Of Old World origin.
- Senecio Jacobaea* L. Stinking Willie. — Wellington. — Nat. of the Old World.
- Silybum marianum* (L.) Gaertn. Lady's Thistle. — Wellington. — Nat. of S. Eu.
- Sisymbrium Irio* L. Bruce Pen. — Nat. of the Old World.
- Solanum rostratum* Dunal. Buffalo Bur. — Wellington. — Nat. in the west.
- Solanum tuberosum* L. Potato. — Wellington. — Native of South America.
- Stachys germanica* L. Downy Woundwort, Mouse-ear. — Wellington. — From the Old World.
- Succisa pratensis* Moench. — Wellington. — Native of the Old World.
- Symphytum asperum* Lepech. Bruce Pen. — From the Old World.
- Syringa vulgaris* L. Common Lilac. — Wellington, Bruce Pen. — Nat. of the Old World.
- Taraxacum laevigatum* (Willd.) DC. (T. erythrospermum Andr.) Red-seeded Dandelion. — Wellington, Bruce Pen. — Nat. of Europe.
- Thymus Serpyllum* L. Creeping Thyme. — Wellington. — Nat. of the Old World.

Tradescantia virginiana L. Virginia Spiderwort. — Wellington. — More southern in its distribution.

Trifolium arvense L. Rabbit-foot Clover. — Wentworth, Wellington. — Nat. of Eurasia.

Trifolium incarnatum L. Crimson Clover. — Wellington. — Nat. of Eu.

Ulmus campestris L. English Elm. — Wellington. — Native of Europe.

Veronica maritima L. Wellington. — Native of the Old World.

Veronica Teucrium L. Wellington. — Native of the Old World.

Veronica Tournefortii C. C. Gmel. — Wellington. — Native of the Old World.

Viburnum Lantana L. Wayfaring Tree. — Wellington. — Native of Eurasia.

Vicia villosa Roth. Hairy Vetch. — Wellington. — Native of Eurasia.

Viola odorata L. English or Sweet Violet. — Wellington. — Of European origin.

CONCLUSION

In studying the foregoing lists it will be observed that plants from all over the world are represented. Some have found their new home to their liking, or have been able to adapt themselves to new ecological condi-

tions, and flourish with great vigour. Others are local immigrants, but may at some future date receive the necessary biological impetus to cause them to spread, therefore they form potential enemies. Many apparently do not survive more than one or two seasons. Whatever may be the span of their existence, the fact that they can grow in our geographical area is a noteworthy observation.

Some 432 species are included in the present study, and the greater number of these are distributed among the following families:

| | | | |
|----------------------------|----|--------------------------|----|
| Compositae | 74 | Polygonaceae | 12 |
| Gramineae | 50 | Boraginaceae | 12 |
| Cruciferae | 36 | Chenopodiaceae | 11 |
| Leguminosae | 25 | Solanaceae | 10 |
| Labiatae | 22 | Amaranthaceae | 7 |
| Caryophyllaceae | 20 | Umbelliferae | 7 |
| Scrophulariaceae | 16 | Euphorbiaceae | 6 |
| Rosaceae | 15 | | |

Of this number, 266 species are found in Waterloo County, and this forms about one-quarter of our known flora.

It is realized that no survey is ever complete, and this one is no exception, but it is hoped that future work may add further information on the very essential study of introduced plants.

THREE RECENT ADDITIONS TO THE CHECK LIST OF SASKATCHEWAN PLANTS¹

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DURING the seasons of 1945 and 1946 three plant species not previously recorded for Saskatchewan (Fraser and Russell, 1944) were collected by the authors and their associates. The collections were made during the course of studies conducted by the Pasture Research Division of the Experimental Station. These plants are *Streptopus amplexifolius* (L.) DC. var. *americanus* Schultes, *Oxybaphus nyctagineus* Sweet and *Cirsium plattense* (Rydb.) Cockerell. Specimens have been deposited in the Station herbarium and duplicates sent to the herbaria of the University of Saskatchewan, Saskatoon, and of the Division of Botany, Science Service, Department of Agriculture, Ottawa.

Streptopus amplexifolius (Coll. No. 45-179) was found in Cypress Hills Park, 20 miles south of Maple Creek, Sask., in August, 1945 by the senior author. The exact location was Section 20, Township 8, Range 26, West of the Third Meridian. The site was a fairly moist spot at an altitude of about 3,800 feet, in forest dominated by *Picea glauca* and *Pinus contorta* var. *latifolia*. Only a very few plants were found, and no opportunity has occurred subsequently to determine the possible occurrence of the species in other parts of the Cypress Hills area. The specimens fit the description of variety *americanus* according to the treatment of the species by Fassett (1935). The range of this variety

¹) Received for publication February 4, 1947.

is given as "Greenland to New England and to North Carolina in the mountains; rarely about the Northern Great Lakes region; Alaska to Washington; and in mountains to Arizona and New Mexico".

The nearest localities from which the species has been reported previously are all several hundred miles distant. These are the Rocky Mountain foothills of southwestern Alberta, the Black Hills of South Dakota (Over, 1932) and the Riding Mountains of southwestern Manitoba (Lowe, 1943). Although this species occurs rather commonly in wooded areas as far west as Manitoba and in the Rocky Mountains, it has not been reported for the forest zone of Northern Saskatchewan, nor of Alberta east of Edmonton according to Dr. E. H. Moss.

Oxybaphus nyctagineus (Coll. No. 46-193) was collected about 13 miles east of Swift Current on Section 3, Township 17, Range 11, West of the Third Meridian by W. A. Hubbard in July, 1946. A dense and fair sized patch was growing in cinders on the railroad grade at this site. Later another patch was discovered just west of Swift Current, also on the railroad grade. This plant has been reported previously in southwestern Manitoba (Lowe, 1943), and has been collected as far west as Portage la Prairie and Souris River. It is rather common in North Dakota according to Professor O. A. Stevens. *Oxybaphus nyctagineus* is a weedy, mid-Western species which appears to be spreading both east and west along railroads and roadsides (Groh, 1943). To date it has not been recorded in Alberta or Montana.

Cirsium plattense (Coll. No. 45-125) was found about 20 miles north of Weyburn in southeastern Saskatchewan by R. T. Coupland and W. A. Hubbard in July, 1945. The location was Section 1, Township 12, Range 13, West of the Second Meridian. The plants occurred sparingly on an abandoned field occupied by various weedy species. The native sod of the district was dominated by *Stipa-Agropyron-Bouteloua* grassland (Mixed Prairie). This collection represents a considerable northward extension of the known range of *Cirsium plattense*, which is given as "Nebraska and Colorado" by Rydberg (1932) and also southern South Dakota (Over, 1932). The

prairie thistles are admittedly a difficult group and in need of critical study. *Cirsium plattense*, however, with its ochroleucous flowers and thick, glutinous involucre bracts appears to be a distinct entity, different from the common and more widely distributed *Cirsium undulatum* which it closely resembles vegetatively.

The authors are indebted to Professors E. H. Moss, University of Alberta, Edmonton; W. E. Booth, Montana State College, Bozeman; O. A. Stevens, North Dakota Agricultural College, Fargo; W. H. Over, University of South Dakota, Vermillion and W. L. Miller, South Dakota State College, Brookings for data concerning the occurrence of these three species in their respective regions. The assistance of Dr. H. A. Senn, Senior Botanist, Division of Botany, Science Service, Ottawa, who verified the identifications and supplied much information regarding Western Canadian collections of these species is gratefully acknowledged.

In addition to the plants mentioned above, several grasses not previously reported for Saskatchewan have been collected. These will be treated in a later paper.

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BOOK REVIEWS

The Land and Wildlife.—By Edward H. Graham. xiii 232 pp. 32 plates. 1947. Oxford University Press, New York.

The regeneration of a country's wildlife resources depends on the development of a land use policy that allows for the provision of suitable habitats. The logic of this apparently simple ecological principle has only recently been appreciated. Early in the days of settlement a scarcity of the food — and fur — producing animals near at hand brought forth regulations restricting the "take" of game. Predators, of course, were blamed and bounties were placed on them. Later on when it was apparent that many species might become extinct, large tracts of the public land, usually in remote areas and often not ideal for the species concerned, were closed off as refuges. This halted the decline of some, but others, even when supplied with additional food, continued to dwindle. The program advocated to-day is more indirect. The environment must first be built up. When shelter and food is provided, the way in which furbearers, game birds and fish respond is truly remarkable.

Various categories of land require different management and the wildlife crop will differ accordingly. Marshes and swamps produce a crop of muskrats and water fowl when water-levels are adjusted, ditches opened-up and food plants established. The impounding of surface waters and the fertilization of the pools so formed is a conservation measure already paying off in fish and soil saving. Reclamation works on gullies, on eroding and depositing water courses, mine dumps and rock piles repay with an added dividend if planned to encourage wild animals and birds. The "principle of the edge" is as important in hedgerows and wind-breaks as it is in swamp-ditches and margins of streams and ponds. The increase in the wildlife population bears a definite relationship to the extent of such borders where two types of vegetation-cover come side-by-side.

The conservationist must be aware of the interests of others that may conflict with his and must be ready to make a compromise.

Swamps breed mosquitoes and tie up potential crop land, river courses are economical repositories of municipal and industrial wastes, hedge-rows occupy valuable space and harbour predators which attack the farmer's poultry and stock or despoil his crops and orchards. Under a carefully arranged plan for land use, there remains plenty of space not profitable for use in some such manner and in many cases it will be found that if the environment provides wild creatures with suitable homes, they are likely to find it less desirable to forage in the places men usually frequent.

This book, by the Chief of the Biology Division, Soil Conservation Service, United States Department of Agriculture, is not a manual of wildlife methods. It is rather a sound discussion of the need, the cost and the return of wildlife practices written in a convincing and readable fashion. The 69 photographic illustrations are well selected to cover the various aspects of the topic, in many cases giving the "before and after" picture of undertakings. The majority of the 150 references are to recent publications and reports and indicate the current consciousness of wildlife conservation. A descriptive sentence or two describes the contents of each publication cited.—W. G. Dore.

Handbook of the Trees of the Northern States and Canada east of the Rocky Mountains. By Romeyn Beck Hough. MacMillan Company, New York 1947, pp. 470, with 479 photographs, \$5.50.

This handbook aims to include "The native and naturalized trees of North America lying north of the northern boundaries of North Carolina, Tennessee, Arkansas and Oklahoma and east of the Rocky Mountains, and extending southward in the Appalachian region to northern Alabama and Georgia". On pp. 1-417 are described 200 odd species of trees; of each is given a full-page illustration showing foliage, twigs and fruits; also there are photographs of live trees showing bark, and enlarged cross-sections of the wood. Besides, there are most useful notes on the texture, weight and use of the wood of most species. On pages 418-457 is a convenient synopsis of the species with analytical keys. At the end

there is a glossary and index to species and synonyms given in the text.

The need for a new edition of this popular handbook has long been felt by foresters, lumbermen and outdoor people. The present edition, however, is merely a reprint of the 1907 edition and it is a pity that the publishers have not seen fit to have the nomenclature and geographical distribution of species brought in line with our present knowledge. In the maps giving the distribution of species, the political boundaries of the Canadian provinces are shown as of 1907. The photographs illustrating details of species are good but those showing live trees and bark details are definitely dated by the strong halation caused by light through the foliage.—A. E. Porsild.

The Flora of Nova Scotia.—By A. E. Roland. *Proceedings Nova Scotian Institute of Science*. Vol. XXI, Parts 3 and 4, pp. 95-642, 127 figures and 477 maps, bibliography, glossary, index to species. 1947.

Dr. Roland's manual is an important and timely contribution to eastern Canadian botany. It is the first comprehensive treatment of a most interesting physiographic region which combines several distinct geographic elements in its flora. Some 1202 species and 222 varieties of ferns and flowering plants (excluding grasses) have been treated by keys so constructed as to assure a reasonably certain identification without detailed specific descriptions. The many figures and maps add materially to the value of the manual. Notes on habitat, range, synonymy, and special characteristics are given. The nomenclature follows the most recent treatments. Physical and climatic features of the province are discussed, and lists are given to illustrate the six major geographical elements of the Nova Scotian flora.

Since its appearance about a year ago, the reviewer has had occasion to use the manual extensively both in connection with working through collections of M. O. Malte made in the Maritime Provinces during the 1924-1929 seasons (with W. R. Watson in 1927), and in a comparison with the flora of his own special "stamping ground", the neighbouring Gaspé Peninsula. That the keys are well constructed is shown by the fact that they have proven to be workable, and for this reason the manual will be a most useful field tool.

Perhaps the most serious criticism which can be raised is the rather too generalized

delimitation of ranges, especially as regards northward extensions. The following species range into the Arctic Archipelago: *Asplenium viride*, *Equisetum scirpoides*, *Lycopodium Selago*, *L. annotinum*, *Eriophorum angustifolium*, *E. spissum*, *Salix Uva-ursi*, *Silene acaulis* var. *excapa* ("excapa" in the manual), *Ranunculus aquatilis* var. *capillaceus*, *R. Cymbalaria*, *R. Flammula* var. *filiiformis*, *Caltha palustris*, *Saxifraga aizoon*, *Rubus Chamaemorus*, *Empetrum nigrum*, *Solidago multiradiata*. Circumpolar distributions might well have been noted throughout. *Vaccinium myrtilloides* is incorrectly treated as synonymus with *V. canadense* (p. 493). *Woodsia Belli* ("Bellii" in the manual) is incorrectly indicated (p. 145) as "the American relative of *W. glabella*", it being actually the eastern North American derivative of *W. alpina*. The work was probably in press when Fernald pointed out that the North American plant which has been passing as *Epilobium palustre* var. *monticola* is actually the distinct var. *oliganthum* (Rhod. 46: 379. 1944). It is somewhat to be regretted that Dore and Roland's "The Grasses of Nova Scotia" was not reprinted with the present volume. Typographic errors are few.

In spite of these minor defects, some of which are almost bound to occur in a work of this magnitude, the "Flora of Nova Scotia" fills a vacancy long felt by eastern North American botanists. Dr. Roland is to be congratulated on the results of his many years of field work in Nova Scotia.—H. J. Scoggan.

The Summer Birds of Sudbury District, Ontario, — By James L. Baillie, Jr., and Clifford E. Hope; *Contributions of the Royal Ontario Museum of Zoology*, No. 28, pp. 1-32, 1947.

This well-annotated list of 130 species is based mainly on the field investigations of the Royal Ontario Museum of Zoology in the Sudbury District, Ontario, in the period from May 30 to July 29, 1937. Supplementary information gathered from other sources is clearly documented.

In general, species names only are used, pending conclusive taxonomic studies of the splendid collections of Ontario birds in the Royal Ontario Museum of Zoology.

A map of the district is conveniently located on the inner side of the front cover, and a perhaps too-brief account of the general features of the country is included in the introduction.

The annotated list details definite information on local distribution, numerical status, and evidences of breeding. Much needed breeding data are given for the Cape May and Bay-breasted Warblers; a specimen of *Junco hyemalis cismontanus*, a stray, is recorded; and the northernmost Ontario record for the Lark Sparrow is presented. In addition, there is valuable information on molting dates, nests and nesting sites, and on the respective parts of the male and female in nesting and rearing of young. The paper indicates unusually alert field work. — W. EARL GODFREY.

Flashing wings — By Richard M. Saunders. McClelland and Stewart Limited, Toronto, 1947: x + 388 pp., illustrated by T. M. Shortt, end papers by Barbara Worth. \$4.50.

The keeping of a journal adds immeasurably to the pleasure and scientific value of the very popular hobby of bird watching. Richard M. Saunders is a Toronto bird watcher and "Flashing Wings" is a compilation of entries in his journals.

No fair-weather dilettante, the author takes us into the field month by month through the changing seasons of the entire year. Whether watching birds through the veil of a winter snow storm or the shimmering heat haze of summer, whether describing his first exciting suspicion of a new bird for the region or the home life of a mere crow, his enthusiasm is genuine. He writes with delightful simplicity and sincerity, sometimes with humor.

T. M. Shortt's illustrations are the work of an artist who combines enough imagination to make his subjects interesting with an accuracy in detail and posture that comes only of intimate knowledge of the living bird. His drawings are charming and his painting (of the Whistling Swan on the jacket and frontispiece) illustrates superbly the spirit that pervades the pages inside.

Appendix A contains a very useful migration chart which shows the average, earliest, and the latest arrival and departure dates for both spring and autumn. A list of the 327 bird species (a surprising variety), which have been recorded from the Toronto

region is given. Appendix B details the results of the Brodie Club's Christmas Bird Censuses for the 21 years, 1925-1945 inclusive.

In Appendix A, the use of the name "Red-backed Junco" for, presumably, the Oregon Junco is confusing since the former has long been the accepted name of a race of juncos of another species (*Junco caniceps dorsalis*) which has not been recorded in Canada. In the same list, the Hoary Redpoll is given as "Arctic (Hoary) Redpoll" while its close relative, the Common Redpoll, is listed as "Redpoll Linnet (Common Redpoll)." It would obviate confusion and perhaps error to follow the vernacular nomenclature of the A.O.U. Check-list. On page 355, exception may be taken to the sure identification of scoters which do not possess a "wing pattern" as American Scoters, since of course lack of wing pattern on the birds observed did not exclude the Surf Scoter which also was recorded on the same date.

These small criticisms do not in the least obscure the fact that the book contains a great deal of interesting information which is entertainingly presented. Readers who cannot get into the field will enjoy all the field trips vicariously; the desultory bird watcher will profit by the author's enthusiasm and purpose; and the dyed-in-the-wool enthusiast will at once recognize in the author a kindred spirit. — W. EARL GODFREY.

Pearse, Theed, 1946. **Notes on changes in bird populations in the vicinity of Comox, Vancouver Island, 1917-1945.** Murrelet, 27, No. 1, pp. 4-9. The continuous coniferous forest has been removed, to be replaced by deciduous shrubs; settlement still remains a fringe along the coast; numerous changes in bird life have occurred and the author briefly sketches the changes for various species. In conclusion he says there is no doubt the population of that portion which has been logged over, has increased, as against what it carried when forested. In other parts the probability is that some species have declined but the total population may well remain the same. — A. L. RAND.

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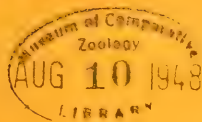
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AUG 10 1948

RECENT OBSERVATIONS ON NEWFOUNDLAND BIRDS IN THE ARGENTIA-DUNVILLE AREA¹

LESLIE M. TUCK

Gander, Newfoundland.

ARGENTIA is located at 47° 19' N., and 53° 59' W., on the Avalon Peninsula in southeastern Newfoundland. It is situated about midway of the east shore of Placentia Bay and sixty-five miles west of St. John's. For the purposes of the present paper, the area was restricted to three miles of the Argentia coast (Latine Point to Point Moll) and approximately five square miles of diversified habitat surrounding the settlement of Dunville, three miles to the east.

The coast line at Argentia is quite varied, being composed of sheer cliffs jutting into the sea, low rocky stretches with kelp beds, sandy beaches and small mud flats. Unless otherwise stated, all shorebird data were secured in this locality. The territory immediately bordering the coast consists of grassy headlands backed by scrubby spruce and larch, and open savannahs bordered by spruce and fir stands. Numerous small ponds and brooks lead back into the interior.

Dunville is situated near the head of a narrow inlet extending five miles inland from the coast. The country here is cut-over and now of secondary deciduous growth, but scattered around the cultivated areas are thickets of alder and larch, a few marshy hollows, and a background of spruce stands. The eastern side of the inlet opposite Dunville reached an elevation of 500 feet in as many yards and was covered with large areas of tall evergreens with an intermediate area of mixed evergreen and deciduous trees, and the lower slopes of luxuriant grey birch, cherry and mountain ash.

To workers unfamiliar with Newfoundland birds, the writer must point out that the notations of status are based on his understanding of the birds of this coastal strip, and that a territory extended even ten miles into the interior would have changed the picture

entirely. This is particularly true of coast loving birds like the northern horned lark and the American pipit and of species preferring inland habitats such as most warblers, most sparrows and of larger birds — the Newfoundland downy woodpecker — Newfoundland crossbill, and others. Of the 101 species listed, thirty, indicated by an asterisk (*) have not been recorded previously from the Avalon Peninsula, and two represent the first Newfoundland records.

The only previous publications dealing with the ornithology of eastern Newfoundland seem to be those of E. A. Brooks (1936) who spent 9 days in the summer of 1932 studying the birds of the Avalon Peninsula; K. B. Rooke (1935) who worked chiefly in the Grand Falls region, near the center of the Island, but also obtained some interesting records from the Avalon Peninsula; J. W. Aldrich and D. C. Nutt (1939), the junior author of which spent a total of 13 days in early July and early September ashore on the Avalon Peninsula; W. Templeman (1945) who kept notes on seabirds while engaged on fisheries research during the summers of 1939-40; H. S. Peters and T. D. Burleigh (1945) who spent 5 weeks of the spring of 1942 and 5 weeks of the early summer of 1943 in Newfoundland.

The writer has spent the past six years as an employee of the U.S. Naval Operating Base at Argentia. During this period, a considerable amount of spare time, but without the taking of complete notes, was spent in observing the bird-life of the region. At the suggestion of Harold S. Peters and Thomas D. Burleigh, U.S. Fish and Wildlife Service, who have been cooperating with the Newfoundland Department of Natural Resources in a study of bird life of this country, I undertook the collecting of specimens and a systematic recording of all birds encoun-

¹) Received for publication April 24, 1948.

tered from January 1 to September 16, 1947, which is summarized in this paper. On the latter date I moved to Gander. Being employed, the most frequent periods available for observations were from noon to 1 p.m. at Argentia, and from 6 p.m. to 8 p.m. at Dunville, with a few early morning checks and several entire days during spring migration.

The writer is indebted to Harold S. Peters who has very generously gone over the entire manuscript and given invaluable criticism and advice; to the officials of the U.S. Naval Operating Base at Argentia, particularly Lt. Felix Childs and Mr. William Steimer for their interest in making possible the necessary permits for observing and collecting in restricted areas; and above all to his wife whose field work for nesting data and help in preparing skins were inestimable.

Specimens collected are in the Fish and Wildlife Service Collection, National Museum, Washington, D.C., or in the Department of Natural Resources, St. John's, Newfoundland. Names are in accord with the fourth (1931) edition of the A.O.U. Checklist and the nineteenth to twenty-second supplements thereto.

COMMON LOON, *Gavia immer immer* (Brünnich). — Common summer resident. Recorded at Dunville and Argentia from April 21 to September 16. Three residents have told me of shooting this loon in mid-winter. (A pair with one young was observed at Four-Mile Pool on July 2, 1945).

HORNED GREBE, *Colymbus auritus* Linnaeus.* — Casual migrant. Several were observed at Argentia from time to time during March and early April. Another was seen at the same locality on four consecutive days from September 10-13.

LEACH'S PETREL, *Oceanodroma leucorhoa leucorhoa* (Vieillot). — Summer resident. One found alive but with a broken wing at Argentia on July 25, after a foggy southwest wind. The nearest nesting locality appears to be on several small islands off Witless Bay, fifty miles east. Residents inform me that it is common on the Cape Shore, and on foggy nights many are attracted to the lighthouses at Cape St. Mary's and Point Verde.

GANNET, *Morus bassanus* (Linnaeus). — Common summer resident. About five thousand pairs nest thirty miles south on the

cliff near Cape St. Mary's; the second largest gannetry in North America. William Dohey, Lighthouse Keeper near this colony, wrote me: "First Gannets arrived March 20. They leave in October and do not remain all winter." During my six years at Argentia, gannets never appeared there until well up in April. An adult with first year immature was observed at Argentia on July 23.

DOUBLE-CRESTED CORMORANT, *Phalacrocorax auritus auritus* (Lesson). — Common summer resident. The nearest nesting colony appeared to be eighteen miles south, on the Cape Shore. As many as thirty-five have been observed in one flock at Dunville, and occasional birds could be seen off the coast all through the summer at Argentia. Known locally by the names of "Carboys" or "Carbos" and "Shags", it was first encountered at Dunville on April 21 and was still present on September 16.

AMERICAN BITTERN, *Botaurus lentiginosus* (Montagu). — Uncommon summer resident. This species nested somewhat sparingly in the surrounding marshes. Occasional immatures were inclined to hang around Dunville Inlet during late August and early September.

CANADA GOOSE, *Branta canadensis canadensis* (Linnaeus). — Uncommon summer resident. Geese were reported from the Avalon Peninsula on March 6, and appeared at Dunville on March 18. At least three pairs nested in this locality to one pair for the previous year. (The first bird to be banded in Newfoundland was a Canada goose, banded at St. George's, September 7, 1935. On October 1, 1947, Canada goose #801124, was shot by Mr. Harold Smith, near Terra Nova Lake. An enquiry of the Patuxent Research Refuge revealed that it was banded on January 24, 1940, at the Austin Ornithological Research Station, North Eastham, Cape Cod, Massachusetts).

BLACK DUCK, *Anas rubripes* Brewster. — Common resident. These ducks were most abundant during the winter. Although the flocks encountered would seldom be more than ten or twelve, a count in mid-winter (January 21) gave a total of 187 in a three-mile stretch of coast. It was the most common duck in summer and nested along the shores of the Inlet and along the rivers.

GREEN-WINGED TEAL, *Anas carolinensis* Gmelin. — Rare summer resident. One flushed

from a gully near Dunville on April 23. Casual observances thereafter. (A flock of more than fifty were flushed at Placentia on September 8, 1945).

AMERICAN GOLDEN-EYE, *Glaucionetta clangula americana* (Bonaparte). — Fairly common resident. Although this species was encountered casually in summer it was most abundant during the winter. Typical counts: fourteen at Argentia, January 26; thirty-six at Dunville, February 16.

OLD-SQUAW, *Clangula hyemalis* (Linnaeus).* — Abundant winter resident. This species never appeared in Dunville Inlet, but remained in goodly numbers off the coast all during the winter. It was most numerous on January 15 when an estimated three hundred appeared off Roche Point. Only stragglers were observed after March 18. On May 5 four females and one male were seen, and a solitary female was observed during the first two weeks of August.

EASTERN HARLEQUIN DUCK, *Histrionicus histrionicus histrionicus* (Linnaeus).* — Rare winter migrant. Four observed at Argentia on January 25, and two on the following day.

EIDER, *Somateria mollissima* (subsp.?). — Abundant winter resident. Eiders were next to the Old-Squaw in abundance during the winter. It was difficult to collect sea birds, and so I was unable to work out the status of the two sub-species. Females and immatures were predominating, and unlike most ducks which were encountered as a winter resident only, they were occasionally observed in the narrow Dunville Inlet. The last spring observation was May 10, when eight were seen at Argentia.

WHITE-WINGED SCOTER, *Melanitta fusca deglandi* (Bonaparte).* — Common winter resident. Scoters remained as a rule too far off shore to identify easily. This species appeared to be the most abundant. One hundred and sixty-three were positively identified at Argentia for the month of January and most of February.

SURF SCOTER, *Melanitta perspicillata* (Linnaeus).* — Uncommon winter resident. Thirty-four were observed for the same period as above.

AMERICAN SCOTER, *Oidemia nigra americana* Swainson.* — Uncommon winter resi-

dent. This appeared to be the least abundant Scoter, and only fourteen were observed during the winter period at Argentia.

AMERICAN MERGANSER, *Mergus merganser americanus* Cassin.* — Fairly common winter resident. On January 16, seven were observed at Argentia, on the following day five, and on January 20, four. Six were seen at Dunville on January 26, and eight on February 16. In both latter cases these birds were with a mixed flock of red-breasted mergansers and American golden-eyes.

RED-BREASTED MERGANSER, *Mergus serrator* Linnaeus.* — Common resident. The most common "Shell Bird", and observed all through the year. Four nests were reported to me during the spring, but there was insufficient time to investigate. Several broods were seen at Dunville early in July.

NORTHERN BALD EAGLE, *Haliaeetus leucocephalus* (Linnaeus).* — Casual visitor. An adult was observed at Dunville on June 18. (I have only one other observation for this area, an immature at Dunville on September 15, 1946).

OSPREY, *Pandion haliaetus carolinensis* (Gmelin). — Common summer resident. This species first appeared at Dunville on April 24. At least five bulky nests in the tops of high spruce trees were located. These nests were in the tall deciduous-evergreen stands bordering the Dunville Inlet and were roughly two miles apart. Ospreys were often seen along the shore line searching for fish. Five were seen at Argentia on September 16.

EASTERN PIGEON HAWK, *Falco columbarius columbarius* Linnaeus. — Common summer resident. One or two of these little falcons could be encountered nearly every day at Dunville. Two immatures were observed there on August 19. An adult was seen harrying shore birds at Argentia on September 16.

ALLEN'S PTARMIGAN, *Lagopus lagopus alleni* Stejneger. — Common resident. This valuable game bird is a resident of the barrens, and encountered there in coveys during the early autumn. In winter, when berries are unavailable it appears to subsist on the tender buds of young birch. There is some evidence to show that these birds congregate on the coastal strips during severe winters, where because of less snow, food is

more accessible. Although fairly abundant in this area, an apparent decline has forced the Department of Natural Resources to permit an open season this year for the month of October only. For the past several years no "Partridge" has been permitted to be sold on the open market or to be on the menu of hotels.

SEMIPALMATED PLOVER, *Charadrius hiaticula semipalmatus* Bonaparte.* — Common summer resident. First appeared on May 6. At least five pairs nested on the open shingle at Latine Point. Young were on the wing by July 17. Flocks upwards of thirty birds were seen on August 8, suggesting the arrival of new birds. Forty-five counts from May 6 to September 14 totalled 827 birds.

BLACK-BELLIED PLOVER, *Squatarola squatarola* (Linnaeus).* — Common fall migrant. A single bird was observed on September 10, and a female collected from a flock of nine on September 12. Fifteen were observed on the following day, and twenty-five on September 14. They appeared to be just arriving by the time my observations were discontinued.

RUDDY TURNSTONE, *Arenaria interpres morinella* (Linnaeus).* — Abundant fall migrant. A flock of twenty-two adults was found on July 26. They became gradually more numerous until by August 6 a daily check averaged two hundred. Immatures appeared on August 18. By August 26 the adults appeared to have moved away, and immatures were predominating. After September 4 an adult was rare. An adult female was collected on July 26, and an immature female on August 18. Of the thirty-five counts from July 26 to September 14, a total of 2,449 birds was recorded.

WILSON'S SNIPE, *Capella gallinago delicata* (Ord). — Common summer resident. Areas around Dunville appeared ideal for this species, and their continual "winnowing" far into the night was a familiar and beloved sound. First heard on April 26, it was encountered in suitable habitat up to September 14. (A nest of four eggs on marshy hummock concealed by grass, June 4, 1945. An immature captured from hiding place in trail, July 1, 1945).

HUDSONIAN CURLEW, *Numenius phaeopus hudsonicus* Latham.* — Common fall migrant,

An early fall migration was in evidence from July 17-28, at which time occasional birds would be encountered on the shore, as well as straggling flocks overhead. A second and more favourable migration was in evidence from September 3-10, when small flocks were constantly in motion. Residents tell me that they appear regularly each fall in great numbers on the barrens of the Cape Shore, where they feed on berries.

SPOTTED SANDPIPER, *Actitis macularia* (Linnaeus). — Common summer resident. This species, although never encountered in flocks, was found all along the shore line of coast, ponds, rivers and estuaries. First observed on May 9. Downy young were observed on July 20 at Dunville and July 22 at Argentia. Young were on the wing by August 2, and were still present September 14.

EASTERN WILLET, *Catoptrophorus semipalmatus semipalmatus* (Gmelin).* — Casual. Single observations were made nearly every day at Argentia from May 5 to June 5. The bird would usually flush from a wet grassy hollow containing a small stream, and would alight on the nearby tundra or even the asphalt runway. A female was collected on May 16.

GREATER YELLOW-LEGS, *Totanus melanoleucus* (Gmelin). — Common fall migrant. Although this species nested sparsely on hummocks in marshy localities inland (young had hatched at Four-Mile Pool by June 29), it is most familiar as a fall migrant. Small flocks were seen at Argentia from early August on. Reports from suitable localities nearby suggested that they were quite abundant.

AMERICAN KNOT, *Calidris canutus rufus* (Wilson).* — Uncommon fall migrant. One observed on August 28, and a female collected on September 3.

PURPLE SANDPIPER, *Erolia maritima* (Brünnich).* — Fairly common winter resident. A flock of forty-six, encountered first on January 9, wintered here. A female was collected on May 5, by which time numerous small flocks appeared to be passing through. These had dwindled down to fifteen after the third week in May and the last observation was two on June 5.

PECTORAL SANDPIPER, *Erolia melanotos* (Vieillot).* — Uncommon fall migrant. A

male was collected from four mixed in with a large flock of semipalmated sandpipers on September 2.

WHITE-RUMPED SANDPIPER, *Erolia fuscollois* (Vieillot).* — Abundant fall migrant. Four came in with the Ruddy Turnstones on July 26. They remained comparatively rare until August 11, when 25 were observed, 40 on August 12, 50 on August 13, and 75 on August 14. They remained at this peak until August 29, when they went out practically overnight. A casual bird was seen up to September 14. Thirty-three checks from July 26 to September 14 totalled 1,198 birds.

BAIRD'S SANDPIPER, *Erolia bairdii* (Coues).* — Uncommon fall migrant. A female, for the first Newfoundland record, was collected from three on September 14.

LEAST SANDPIPER, *Erolia minutilla* (Vieillot). — Common migrant. A few individuals hung around the mud flats at Argentia from May 15 to May 28. An adult male was collected on May 15. Flocks of immatures, as many as fifteen, were seen during the period of July 17-26. An immature male was collected on July 25, and an adult male on August 2. They were very casual from July 26 to August 16, and no further observations were made until the period August 28-September 3, when a few late comers dribbled in.

SEMPIALMATED SANDPIPER, *Ereunetes pusillus* (Linnaeus).* — Abundant fall migrant. This and the White-rump, were the two most common sandpipers encountered during the fall migration. It first appeared on August 11, but did not become numerous until August 22. By September 2 as many as three hundred were estimated in one flock. This had dwindled down to fifty by September 8, and on a final check, September 14, only twenty-five birds were observed. Twenty-three checks from August 11 to September 14, totalled 1,337 birds.

BUFF-BREASTED SANDPIPER, *Tryngites subruficollis* (Vieillot).* — Uncommon fall migrant. A female was collected from three on September 13. Two were observed on the following day. This specimen is the first Newfoundland record.

SANDERLING, *Crocethia alba* (Pallas).* — Common fall migrant. This attractive shore bird was first observed on August 21, when a female was collected. It became more

common by September 10, and on September 14 an estimated 78 were scattered over the small sandy beach, making it the most abundant bird encountered on that date.

GLAUCOUS GULL, *Larus hyperboreus* Gullnerus. — Common winter resident. About one hundred of these large white-winged gulls were resident at Argentia during the winter months. They had entirely disappeared from the region by early March.

GREAT BLACK-BACKED GULL, *Larus marinus* Linnaeus. — Common resident. Several counts in mid-winter indicated a ratio of one "Saddle Back" to ten herring gulls. This species breeds commonly on bare islets in the inland ponds, occupying as a rule, a higher location than the following species.

HERRING GULL, *Larus argentatus smithsonianus* Coues. — Common resident. This was the most common gull, nesting in inland ponds and in the cliffs on the Cape Shore. The gull population for Argentia during the mid-winter was estimated at five hundred, of which this species comprised nearly 80%. During days when ice prevented off shore feeding, these birds would be congregated in one immense flock, on the shore line or even on the extreme ends of the asphalt runway. They would be only slightly disturbed by an aircraft or a vehicle, but remained as wary as ever at the approach of a human.

ATLANTIC KITTIWAKE, *Rissa tridactyla tridactyla* (Linnaeus). — Common resident. Although some seven or eight thousand pairs nest at Cape St. Mary's, the kittiwake was apparently more common in the Argentia area during the winter months.

COMMON TERN, *Sterna hirundo hirundo* Linnaeus. — Common summer resident. An occasional pair nested on the small islands of Dunville Inlet. Several hundred adults and immatures congregated at Argentia from the middle of August on.

RAZOR-BILLED AUK, *Alca torda torda* Linnaeus. — Fairly common resident. Occasional individuals could be seen off Argentia at all times of the year, although they appeared more abundant during the winter months.

ATLANTIC MURRE, *Uria aalge aalge* (Pon-toppidan). — Common summer resident. Between two and three thousand pairs nest at Cape St. Mary's.

BRUNNICH'S MURRE, *Uria lomvia lomvia* (Linnaeus). — Abundant winter resident. This species is encountered in many thousands during the winter months, and is a valuable source of food. It appears to be scarce or absent during the summer months. During the recent war, many hundreds of this species could be found dead along the Argentinia shore line in winter. With feathers coated with oil, they would be helpless in the surf near the beaches, and would be battered around until they drowned or died of weakness.

DOVEKIE, *Plautus alle* (Linnaeus). — Common winter resident. This little bird was abundant in every patch of water among the sheet ice. With the Brünnich's murre, it also frequented the Dunville Inlet during early spring, when the ice had moved out. Casual individuals observed during the summer months may have been cripples. It is shot for food when larger birds are unavailable. On very cold days the dovekie appears to be extremely inactive, and may be approached quite closely and captured with a hand net.

BLACK GUILLEMOT, *Cephus grylle atlantis* Salomonsen. — Common resident. Occasional pairs nested along the Cape Shore. In its winter plumage it was a common sight at Argentinia, but as a rule remained well off shore.

ATLANTIC PUFFIN, *Fratercula arctica arctica* (Linnaeus). — Uncommon resident. Although six thousand pairs nest on the islands in Witless Bay, this species appeared very scarce off Argentinia. Residents are familiar with it, however, and inform me that it is fairly common in winter off the rocky headlands of the Cape Shore.

LABRADOR HORNED OWL, *Bubo virginianus heterocnemis* (Oberholser). — Fairly common resident. Seen and heard casually at all times of the year. Immature, barely able to fly, May 16, at Dunville.

SNOWY OWL, *Nyctea scandiaca* (Linnaeus). — Irregular winter visitor. One was seen pursuing snow buntings at Argentinia, November 19, 1946; another was observed at Dunville, February 14. Residents are familiar with the species as a casual visitor in winter, but recall no years of particular abundance.

SHORT-EARED OWL, *Asio flammeus flammeus* (Pontoppidan). — Uncommon summer

resident. About four observations for Dunville at odd times during the summer.

CHIMNEY SWIFT, *Chaetura pelagica* (Linnaeus)*. — Late summer visitor. Observed in loose flocks up to forty during July and August.

EASTERN BELTED KINGFISHER, *Megasceryle alcyon alcyon* (Linnaeus). — Common summer resident. Observed at Dunville from May 2 to September 7. Numerous nesting burrows can be seen in the sandy banks along the Inlet.

NORTHERN FLICKER, *Colaptes auratus luteus* Bangs. — Uncommon summer resident. Occasionally encountered in winter.

NEWFOUNDLAND WOODPECKER, *Dendrocopos villosus terraenovae* (Batchelder). — Common resident. The type specimen comes from Placentia, three miles to the south of this area. This woodpecker, although preferring tall evergreen stands and burnt over timber, was encountered at some time or other in practically every habitat.

NEWFOUNDLAND DOWNY WOODPECKER, *Dendrocopos pubescens microleucus* (Oberholser). — Uncommon resident. This species was encountered only casually. From past experience, I have found this to be the most abundant woodpecker in the interior, and rare or casual on this coastal strip.

YELLOW-BELLIED FLYCATCHER, *Empidonax flaviventris* (Baird and Baird). — Common summer resident. This species was extremely common around the deciduous stands, and was one of the last summer residents to leave the coast. Seventeen were counted in a small clearing at Dunville on September 7.

NORTHERN HORNED LARK, *Eremophila alpestris alpestris* (Linnaeus). — Abundant summer resident and uncommon winter resident. An extremely common bird on the coastal strip and headlands of Argentinia. A few remain over the winter, feeding on the seeds and along the shore. Large flocks arrive in late March, and migration is again in evidence from early September to late October. Fledglings have been observed on June 3 and as late as September 11. On July 15, a nest of grass, string and feathers, lined with grass and cupped in the ground, was discovered in the narrow lane between

a sidewalk and a main street. The nest had a curious pattern of pebbles by its side and contained four well developed young. Four eggs were found in another nest of grass, small sticks, chips and cotton grass, edged around with small pieces of broken concrete, by a tuft of grass in a gravelly waste, on July 23. Of nearly twenty nests which I have examined, these two are typical. In all cases, material at hand was utilized, the nest was in a depression of grass, or in a gravelly waste partially hidden by a tuft of tall grass. All had a more or less elaborate pavement of pebbles. Young were often cared for by the adults until it was difficult to tell them apart.

TREE SWALLOW, *Iridoprocne bicolor* (Vieillot). — Common summer resident. Several small flocks were observed at Dunville on a rainy day, June 7, quite low and flying earnestly into the interior. Another small flock was observed flying in a similar direction on the following day. These swallows may be observed in loose flocks around the ponds during July and August.

NEWFOUNDLAND JAY, *Perisoreus canadensis sanfordi* Oberholser. — Common resident. Abundant in summer in the tall wooded areas surrounding swampy territory, they appear to prefer the sheltered wooded valleys in winter. A camp fire will attract any birds in the vicinity. Immatures are on the wing by early June.

NORTHERN RAVEN, *Corvus corax principalis* Ridgway. — Fairly common resident. Nesting in cliffs.

EASTERN CROW, *Corvus brachyrhynchos brachyrhynchos* Brehm. — Common resident. Nesting in cliffs and trees. Both crows and ravens were found in goodly numbers along the shore at Argentia during the summer months. Two particular items of food were mussels and sea urchins, which they often carried up to the headlands to break open and eat at their leisure. There was a great tendency to mix during the winter, when the garbage dumps at Argentia and the several piggeries at Dunville offered easy food. Once no human was apparent it was a race between these birds and the pigs as to which got the most food. A count on January 19 revealed 76 ravens and 214 crows.

NEWFOUNDLAND BLACK-CAPPED CHICKADEE, *Parus atricapillus bartletti* (Aldrich

and Nutt). — Common resident. Encountered in every coniferous stand.

ACADIAN CHICKADEE, *Parus hudsonicus littoralis* Bryant. — Common resident. Fifty checks for status purposes revealed this species to be nearly four times as numerous as the black-capped. A nest in a decayed stump on June 29 revealed six naked young.

RED-BREASTED NUTHATCH, *Sitta canadensis* Linnaeus.* — Uncommon resident. Casual observances all through the year.

BROWN CREEPER, *Certhia familiaris americana* Bonaparte. — Uncommon resident. Casual observances all through the year.

EASTERN WINTER WREN, *Troglodytes troglodytes hiemalis* Vieillot. — Common summer resident and uncommon winter resident. Occasional mid-winter observations. The delightful song of this wren was pouring forth from the thickets as early as March 12. Three observations of singing birds perched on the tip-top of trees over forty feet in height. Fifteen were heard in different localities during a five-mile stroll on June 1. Immatures were able to fly well by July 20.

BLACK-BACKED ROBIN, *Turdus migratorius nigrideus* Aldrich and Nutt. — Common summer resident. Robins first appeared at Dunville on March 26. 104 were seen on an early morning stroll, April 12. I obtained records of twenty nests of mud and grass in the crotches of evergreen trees, all of which contained three eggs. The earliest fledglings were seen on May 24 and the latest on August 14. Robins had left the coast early in September, and remained in the interior until early November feeding on blueberries and mountain-ash. It is not uncommon for small flocks to remain all through the winter on the Avalon Peninsula in the vicinity of mountain ash.

OLIVE-BACKED THRUSH, *Hylocichla ustulata swainsoni* (Tschudi). — Common summer resident. The only other thrush observed in this area, the olive-backed, was nearly as abundant as the robin but rarely ventured out of the wooded localities and was never observed in flocks. First observed at Point Moll on June 1, it became quite common at Dunville, several days later. A nest of four eggs was found at Dunville, June 18. It was of twigs sparsely lined with grass and situated at an elevation of nine feet, in the crotch

of a spruce. The nest was quite noticeable in an open glade. This thrush had also left the coast by the first week in September. (The hermit thrush, a fairly common bird of the interior, was entirely absent or overlooked in this area.)

EASTERN GOLDEN-CROWNED KINGLET, *Regulus satrapa satrapa* Lichtenstein. — Common summer resident. This species was well distributed in tall evergreen stands.

EASTERN RUBY-CROWNED KINGLET, *Regulus calendula calendula* (Linnaeus). — Common summer resident. The delightful song of this species began on May 12. It appeared more abundant than the golden-crowned, perhaps because of its penetrating song.

AMERICAN PIPIT, *Anthus spinoletta rubescens* (Tunstall). — Common summer resident. A male, for the first spring record, was collected at Argentia on May 17. Pipits were fairly common on the headlands all during the summer. On September 8, a migration was in evidence and many hundreds could be flushed from the headlands or high tide lines, while loose flocks were continuously overhead. By September 14, they had reached a peak of thousands.

BLACK AND WHITE WARBLER, *Mniotilta varia* (Linnaeus).* — Uncommon summer resident. A male collected at Point Moll on May 30. Only casual observances thereafter.

NEWFOUNDLAND YELLOW WARBLER, *Dendroica petechia amnicola* Batchelder. — Uncommon summer resident. A singing male was collected from an alder at Point Moll on June 1. This was the only observation. (While at Shoal Harbour in June, I watched a pair build a nest in three days in an alder, from available waste. The first egg was laid on June 15, three days after the nest was completed).

MAGNOLIA WARBLER, *Dendroica magnolia* (Wilson).* — Spring migrant. A male was collected at Point Moll on June 1 and one was seen at Dunville, June 18.

MYRTLE WARBLER, *Dendroica coronata coronata* (Linnaeus). — Spring migrant. One was observed at Point Moll on May 30, and a male collected in that vicinity on the following day. (While waiting for a train at Whitbourne, 25 miles N.E. in the interior,

my wife and I counted seven myrtle and two magnolia warblers visible at the same time in a little clearing. A further stroll added four black and white warblers. This may indicate that most of these warblers penetrate farther inland for nesting sites, and are only casual on the coastal strip).

BLACK-THROATED GREEN WARBLER, *Dendroica virens virens* (Gmelin).* — Fairly common summer resident. Two singing males collected and five others observed in a tall coniferous stand at an elevation of 500 feet, Dunville, June 18.

BLACK-POLL WARBLER, *Dendroica striata* (Forster). — Common summer resident. The most common warbler in the area. More than fifty were observed at Point Moll on May 30, and seventy-five on the following day. Of these two observations only three females were in evidence. A nest containing two eggs was discovered at Point Moll on July 5. It was flimsy and weak, and casually placed in the branches of a tiny spruce about eighteen inches off the ground. It was composed of a few dry spruce twigs, a few mosses, but mostly "reinder moss", and lined with small white feathers.

YELLOW PALM WARBLER, *Dendroica palmarum hypochrysea* Ridgway. — Spring migrant. Three individuals were observed at Point Moll on May 30.

NEWFOUNDLAND OVEN-BIRD, *Seiurus aurocapillus furvior* Batchelder.* — Spring migrant. One individual was observed at Point Moll on May 30, and several others heard on the following day.

NORTHERN WATER-THRUSH, *Seiurus noveboracensis noveboracensis* (Gmelin). — Common summer resident. The second most abundant warbler. First observed at Point Moll on May 30, it was encountered everywhere later, even in the densest evergreen stands. Young, unable to fly, were out of their nest at Dunville by July 15.

MOURNING WARBLER, *Oporornis philadelphia* (Wilson).* — Common summer resident. This species was the fourth warbler in abundance for the area. It appeared to be well distributed in the shrubbery all along the coast strip, but particularly so at Dunville where its delightful song could be heard from three and four deciduous thickets at once. Several males were collected and

although no nests were located, many instances were experienced during the latter part of June and the first two weeks of July when both birds would scarcely move fifty feet from where I was searching.

NORTHERN YELLOW-THROAT, *Geothlypis trichas brachidactyla* (Swainson).^{*} — Uncommon spring migrant. A male was collected from a swampy thicket at Point Moll, May 30. This was the only observation.

WILSON'S WARBLER, *Wilsonia pusilla pusilla* (Wilson). — Common summer resident. First observed on May 30 and third in abundance. This little species appeared to occupy the next higher layer of vegetation to the water-thrush. They occupied similar habitats, and when one or more water-thrushes were "squeaked", there would invariably be several Wilson warblers a few feet higher in the same tree.

NORTHERN AMERICAN REDSTART, *Setophaga ruticilla tricolora* (Müller). — Common summer resident. Fifth in abundance and encountered everywhere in deciduous and deciduous-evergreen stands. A nest of four eggs was discovered at Dunville on July 15. It was situated at a height of ten feet on a balsam, being barely held to the side of the trunk by a small dead limb. The outside was covered with silvery bark strips and was so wasp-nest-like in appearance and so matched the bark of the tree, that it was discovered only by accident. The nest was lined with fine grass, thread-like fibres and a few feathers. Whenever the female was disturbed, the male settled down, only to be driven away whenever she decided to return. Two of the eggs had hatched on the following day.

ENGLISH SPARROW, *Passer domesticus domesticus* (Linnaeus). — Common resident. About three hundred have adapted themselves well to the Navy Base, feed in flocks around the Mess and huddle around the steaming man-holes on the coldest days. Nesting commences in late February, in the rafters of hangars and in the abandoned temporary wooden buildings, and is at its height in May.

RUSTY BLACKBIRD, *Euphagus carolinus* (Müller). — Common summer resident. A male was collected at Dunville, April 23, for the first spring observation. An inhabitant

of marshy territory, flocks of immatures and adults were encountered from the latter part of June on. These birds move back from the coast in September, but may stay in the interior as late as October 5.

NEWFOUNDLAND PINE GROSBEAK, *Pinicola enucleator eschatosus* Oberholser. — Common resident. Almost exclusively restricted to tall evergreen stands, flocks could be seen occasionally flying high across the Inlet as they shifted feeding territory. Their mating song in late May delivered from some tall tree commences at sunrise and is delightful to hear.

COMMON REDPOLL, *Acanthis flammea flammea* (Linnaeus). — Common winter resident. Several noisy and wary flocks of thirty and forty spent the winter at Dunville and remained until April 8.

NORTHERN PINE SISKIN, *Spinus pinus pinus* (Wilson). — Erratic fall migrant. A number of flocks were encountered during the previous September, but not a single observation for this period.

NEWFOUNDLAND CROSSBILL, *Loxia curvirostra perna* Bent. — Casual visitor. One of the most abundant crossbills in the interior, this species was so casual, that the occasional appearance of a small flock was a treat.

WHITE-WINGED CROSSBILL, *Loxia leucoptera* Gmelin. — Common resident. Erratic in appearance, on peak days in mid-winter as many as two hundred could be counted, in flocks averaging twenty, over a three-mile hike.

LABRADOR SAVANNAH SPARROW, *Passerculus sandwichensis labradorius* Howe. — Common summer resident. First spring observations at both Dunville and Argentia on May 21. Three days later it was encountered everywhere in suitable habitat. Fledglings barely able to fly, July 15.

SLATE-COLORED JUNCO, *Junco hyemalis hyemalis* (Linnaeus). — Common resident. The dripping notes of the Junco were a familiar sound in spring and summer. In winter it was encountered in flocks up to fifty and in some localities was the more familiar "Snow Bird".

WHITE-THROATED SPARROW, *Zonotrichia albicollis* (Gmelin). — Fairly common sum-

mer resident. First observed at Argentia on May 28, and encountered generally in the drier open glades.

EASTERN FOX SPARROW, *Passerella iliaca iliaca* (Merrem). — Common summer resident. First observed at Dunville on April 4. Three or four inches of snow fell soon after, but small flocks could be seen scratching small areas in the fields. In full song by April 10, and with young able to fly quite well by June 7. A number of nests were recorded, all made of green moss lined with grass or a few feathers and cupped in the ground under the shelter of a low evergreen branch. Like most passerines, this species had left the coast by early September. However, it remained in the interior where a few exuberant individuals were in full song up to October 12.

LINCOLN'S SPARROW, *Melospiza lincolnii lincolnii* (Aububon). — Rare spring migrant. Apparently a bird of the interior. A single observation at Argentia on May 28, in a mixed flock of white-throats and swamp sparrows.

WESTERN SWAMP SPARROW, *Melospiza georgiana ericrypta* Oberholser. — Common summer resident. First observed at Argentia on May 28. Well distributed in marshy habitats and in full song by June 1.

EASTERN SNOW BUNTING, *Plectrophenax nivalis nivalis* (Linnaeus). — Common winter

resident. Several hundred wintered at Argentia, arriving on November 11, and remained sedentary until well up in April, feeding particularly on the lawn seed hopefully sown each year. A few migrating flocks appeared to be going through from early April, and a few stragglers hung around until May 3. During late April occasional birds could be heard singing from the roof of a five-storey building. It was a pleasing strange song, and a change from the "giggling" notes of the winter.

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BIRDS OBSERVED IN THE VICINITY OF MEDICINE HAT¹

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THESE NOTES are the result of observations made in the town of Medicine Hat, and on the prairie northwest of it, from May, 1943 to December, 1946. The recording of this information is prompted by the relative scarcity of ornithological reports from this rather unusual quarter of southeastern Alberta. However, it is fortunate that a paper on the vertebrates of the southern Canadian plains has just been published, and from it the reader may gain a general picture of the country.²

The majority of the observations were made in the area of treeless, arid, short-grass prairie bounded on the east by the South Saskatchewan River, on the south by the C.P.R. main line, on the north by the Red Deer River, and on the west by the Brooks-Tilley system of irrigated farmlands. In this area, trees are to be found only in the scattered farmsteads, now abandoned; and brush (snowberry, wild rose, buffalo berry and dwarf birch) on sand dunes in the north-eastern portion. Observations on small arboreal birds were made for the most part on the western edge of Medicine Hat bordering the Saskatchewan River. A few records are included from the Brooks-Tilley area and from the western end of the Cypress Hills.

The bird fauna of the open prairie during the breeding season is restricted to a few species. The horned lark is the most abundant, followed by chestnut-collared longspur, western meadowlark, lark bunting and McCown's longspur. The high wheeling of the Swainson's hawk and the low gliding of the marsh hawk also are typical sights in the hot summer days.

Wherever there is standing water, however, there is a profusion of birds. The marshes and shallow lakes abound with shore birds such as killdeer, willet, phalarope, avocet and godwit. Ponds and lakes contain many pairs of breeding ducks, typically mallard, pintail, shoveller and gadwall.

The species found in the riverside city of Medicine Hat, with its cottonwoods and other shade-trees, are of a quite different nature.

They include vireos, woodpeckers, flycatchers and orioles, as well as the robin and the yellow warbler, the only resident warbler observed in the region. Within the confines of the town both eastern and western species overlap, — Eastern and Arkansas kingbirds, yellow-shafted and red-shafted flickers, Baltimore and Bullock's orioles.

In the spring and in the fall the prairie fauna is enriched by a number of migrant species on their way to and from the northern woods and forests. In late March and throughout April, small groups of robins, bluebirds, juncos, goldfinches, vesper sparrows, myrtle warblers, eastern kingbirds, yellow-shafted flickers and the odd nuthatch make their way across the naked grasslands.

The procession of migrants as summer wanes and winter approaches is more impressive. The first to pass are the hawks (duck, pigeon, sparrow and ferruginous rough-leg, the American rough-leg migrating later), appearing in late August. Then come a succession of small birds throughout September (flocks of juncos, goldfinches, blackbirds and bluebirds, and groups of woodpeckers and meadowlarks). October sees the arrival and departure of great flights of mallard, pintail, scaup and other ducks, particularly in the irrigated lands. Early November sends wedges of Canada geese, whistling swans and "waveys". Then flocks of snow bunting come to stay, and on the tail of the first severe cold front in late November the snowy owl appears.

The following comprises a list of the 128 species of birds observed in this region:

Horned Grebe

Colymbus auritus. — Common in lakes and sloughs. Every stretch of water contains at least three breeding pairs.

Eared Grebe

Colymbus nigricollis. — Also common in lakes and sloughs, a breeding resident.

Western Grebe

Aechmophorus occidentalis. — Not common. Three seen on small lake June 22, and juveniles during early September, 1944. One captured alive, unable to fly, on small pond, Oct. 5, 1946.

¹ Received for publication January 3, 1947.

² Notes on the vertebrates of the southern plains of Canada by M. Y. Williams. Can. Field-Nat. 60: 47, 1946.

Double-crested Cormorant

Phalacrocorax auritus. — Abundant on an island in Lake Newell, a large artificial lake south of Brooks. (Observed by F. A. Banfield).

Great Blue Heron

Ardea herodias. — Confined to rivers. One seen in flight at Medicine Hat, Aug. 18, 1946.

Whistling Swan

Cygnus columbianus. — Migrant. First seen over region on March 28 (1946). A flock of eight seen on small lake in late April (1944). Fall migrants observed on same lake on Oct. 24, 1944 and Oct. 15, 1946.

Canada Goose

Branta canadensis. — Abundant migrant. First flights in spring seen on March 25 (1946). First fall flights observed on Sept. 12 (1945). Fall migrants congregate in great numbers on lower Red Deer River (Bindloss east to Empress, Alta.), particularly in stubble fields. Last migrants leave at freeze-up (about Nov. 15).

Snow Goose

Chen hyperborea. — Migrant. Spring migrants seen on small lake in early April (1944). Fall migrants observed occasionally flying over the region, Oct. 15 to Nov. 4, 1936.

Mallard

Anas platyrhynchos. — Very abundant on all bodies of water, especially during fall migration. One weedy lake, 1 mile wide, contained an average of one thousand birds in September. Common also in irrigation ditches and in stubble fields, forming about one-half of hunter's bag. Last migrants seen on Saskatchewan River at Medicine Hat on Nov. 12, 1945.

Gadwall

Chaulelasmus streperus. — Common resident. Three pairs noted on small lake in late May; 2 pairs on a slough in June, and 3 individuals on Saskatchewan River, June 18, 1944. Juveniles noted on lakes in early September. About one-eighth of the fall ducks shot are this species.

Baldpate

Mareca americana. — Six pairs noted on a lake in May, 1944. Common in migration in late September, but seldom shot.

Pintail

Dafila acuta. — Abundant breeding resident on all bodies of water. First spring migrants seen on March 30, 1945. Common fall migrant, forming about one-fifth of the hunter's bag.

Green-winged Teal

Nettion carolinense. — Breeding resident, occurring in pairs or in flocks on all bodies of water in May. Not so conspicuous in fall migration.

Blue-winged Teal

Querquedula discors. — Breeding resident, though not as abundant as preceding species.

Shoveller

Spatula clypeata. — Breeding resident, moderately common on all marshy lakes, being conspicuous in late May. Juveniles noted in August. Not commonly shot in fall migrations, avoiding stubble fields.

Canvas-back

Nyroca valisineria. — Small flocks noted in May on larger lakes, and more extensive flocks in early September. Not commonly shot due to habit of settling well away from land on larger lakes.

Lesser Scaup Duck

Nyroca affinis. — Common on open water on prairie lakes and rivers in May. This "blue-bill" is quite conspicuous in the fall migration, accounting for about one-fifth of the ducks shot.

Common Goldeneye

Glaucionetta clangula. — Evidently a migrant. Small flocks noted on lakes in May and again in early September.

Bufflehead

Charitonetta albeola. — Not common. Two pair observed on open lake, May 24, 1944. One shot over slough, Oct. 21, 1946.

American Scoter

Oidemia americana. — A flock of about 40 birds were observed on May 30, 1944 on the sandy shore of a lake, engaged in cleaning themselves of amphipod parasites in which the lake abounded. One specimen was shot and proved definitely to be this species. About an ounce of parasites was obtained from this specimen, which proved to be *Hyaella azteca* (Sauss), a common fresh-water form (determination obtained from the Smithsonian Institution through the kindness of Prof. W. H. Elder, University of Missouri). The flock remained on the lake for at least two weeks.

Ruddy Duck

Erismatura jamaicensis. — A flock of about 10 pairs observed on small lake on May 31, 1944, departing on the following day. The males were in high breeding plumage, with tail cocked and chest pouted, leading their

admiring females with soothing noises. One shot at Brooks, Alta. on Sept. 23, 1944.

Red-tailed Hawk

Buteo borealis. — Absent on prairies. One specimen seen sailing above wood land slopes at Elkwater in the Cypress Hills, June 24, 1945.

Swainson's Hawk

Buteo swainsoni. — A breeding resident, and one of the most characteristic and abundant birds of the Southern Alberta prairie. On careful observation, all buteos seen from May to July prove to be various colour forms of this single species. It first returns in March, a few days after the first gophers (*Citellus richardsoni*) appear above ground. The large ungainly nests of coarse twigs are commonly found in farm windbreaks or on the ground. The 3 to 4 fledglings have been encountered as early as June 9, and unhatched eggs have been observed as late as June 16 and even July 4, 1944.

American Rough-legged Hawk

Buteo lagopus. — Seen sparingly hovering over the prairies, particularly in the fall. One individual was noted in the same general area throughout late August and early September. Other dates of observation of isolated birds are Sept. 15, Sept. 27, Oct. 28, and Nov. 10 (this last a pair).

Ferruginous Rough-leg

Buteo regalis. — Also sparingly seen in late summer and early fall, particularly the less wary juveniles. Of 6 individuals noted in late August, 3 had been shot. Last fall record was Oct. 8, 1944; and the first spring record March 30, 1945.

Golden Eagle

Aquila chrysaetos. — A pair of this magnificent species were observed in June, 1944, presumably nesting somewhere in the steep-banked coulees in the isolated northern part of the area. From observation by at least 6 men (who noted the white, black-bordered tail of the birds), the range of this pair was at least 100 square miles. Subsequently in August, two juveniles were noted sitting on telephone-poles in the southern part of the area, and several specimens were seen in September. One specimen was seen on the area in January, 1945, a mild winter.

Marsh Hawk

Circus hudsonius. — A common resident. Specimens are frequently seen hawking over

fields, sloughs and lake-shores, seldom over 20 feet above the ground, and in steady motion.

Prairie Falcon

Falco mexicanus. — No midsummer records, in contrast to those reported by M. Y. Williams. Observations are fleeting, since the birds move fast out of sight with shrill cries. The first fall record was obtained on Sept. 10, 1944, and the last on Oct. 16, 1943. One spring record was obtained in May, 1943.

Peregrine Falcon

Falco peregrinus. — The "Duck Hawk" was observed very frequently (about 20 times) in August and early September, 1944. Only one spring record was obtained, on June 16, 1943.

Pigeon Hawk

Falco columbarius. — A conspicuous late summer migrant. Records for the same one area in 1944 ran as follows: July 18, Aug. 2, Aug. 15, Sept. 3, Sept. 9, Sept. 21, Sept. 27, and Oct. 5. Observations made in 1945 and 1946 showed the peak of the migration to be in the first week of September, as many as 6 being seen in an hour. The only spring record was a pair passing rather high over Medicine Hat on April 30, 1944.

Sparrow Hawk

Falco sparverius. — Frequently seen in late summer migration. Seven specimens observed between Aug. 7 and Sept. 9, 1944. First spring migrant seen on May 6, 1945.

Sharp-tailed Grouse

Pedioecetes phasianellus. — Abundant in windbreaks of abandoned farms, and in brushy sandhills, especially in the northern part of the area. Not common elsewhere. Their numbers suffer markedly from prairie fires.

Gray Partridge

Perdix perdix. — Small groups of 4 to 10 of the fast-flying "Huns" are occasionally found in old windbreaks, and often suddenly appear close by habitations.

Ring-necked Pheasant

Phasianus colchicus. — Very abundant in the irrigated area around Brooks, lurking in reeds and along brushy fencerows, whence they emerge to feed in the fields. Their numbers decreased in 1945 and 1946 evidently owing in part to excessive shooting. Rare elsewhere, although the most isolated oases of undergrowth on the bald prairie may occasionally show a pheasant or two.

Sandhill Crane

Grus canadensis. — Three migrant birds were observed circling a small prairie lake on September 9, 1944.

Sora

Porzana carolina. — One migrant stayed around buildings of prairie camp, May 7 and 8, 1947.

Coot

Fulica americana. — Breeding resident. Common on small lakes and ponds, arriving in late May. Occasional large bodies of water, e.g. above the dam at Bassano, may show aggregations of up to 100 coots in late summer.

Killdeer

Oxyechus vociferus. — Breeding resident. Exceedingly common and conspicuous, especially on slough margins. First spring records are March 14 for 1945 and March 25 for 1946. Young birds are hatched and running by June 16 (1944). Fall migration is almost completed by the end of August (1944).

Black-bellied Plover

Squatarola squatarola. — A single migrant was noted on the margin of a prairie lake on August 29, 1946.

Wilson's Snipe

Capella delicata. — Specimens observed in marshy fields in irrigated land north of Tilley on Oct. 13 and 16, 1946, where they are evidently quite common.

Long-billed Curlew

Numenius americanus. — A breeding resident but not common. Three specimens were observed (June and July, 1944), on upland range rather far from water. A flock of about 20 was found at Ronalane on June 18, 1946 in the valley of the Bow River; they were congregated on a sloping meadow and seemed reluctant to move.

Spotted Sandpiper

Actitis macularia. — Specimens seen along Saskatchewan River at Medicine Hat in July and August.

Solitary Sandpiper

Tringa solitaria. — Single specimens observed on shore of prairie lake, Aug. 6 and 11, 1944.

Willet

Catoptrophorus semipalmatus. — A common breeding resident on lakes and sloughs, their raucous cries being characteristic of these prairies. Their families are migrating by the end of August.

Lesser Yellowlegs

Totanus flavipes. — A pair were seen on the Saskatchewan River at Medicine Hat on August 6, 1945.

Dowitcher

Limnodromus griseus. — A group of 3 was seen on shore of prairie lake on August 7, 1944.

Semipalmated Sandpiper

Ereunetes pusillus. — A flock of 6 was observed frequenting shores of prairie lake from August 7 to Sept. 9, 1944.

Marbled Godwit

Limosa fedoa. — Breeding pairs are quite common in weedy sloughs, and small groups often occur. This tame and vociferous species remains until early September.

Avocet

Recurvirostra americana. — A quite common breeding resident in weedy sloughs. One slough, two hundred yards wide, contained 8 pairs of these handsome birds in May, 1944. They depart by mid-August.

Wilson's Phalarope

Steganopus tricolor. — Quite abundant breeding residents on the marshy lakes, often in groups of up to 10 adults. They flock in September, when flights of about 50 may be seen flying up and down the prairie lakes.

California Gull

Larus californicus. — This species, along with the "Ring-Bill", is the common gull of the region, returning in late April. It is found on all prairie lakes, whence it flies inland to find sewage and garbage dumps.

Ring-billed Gull

Larus delawarensis. — Seen in mixed flocks with the preceding species. Earliest spring record April 3, 1946.

Franklin's Gull

Larus pipixcan. — Small flocks may be observed in May and June, occasionally in company with larger gulls. A large flock of about 50 was seen flying before a storm on Sept. 15, 1944.

Black Tern

Chlidonias nigra. — A quite common resident on certain marshy lakes in May and June.

Mourning Dove

Zenaidura macroura. — Two breeding pairs were observed on the prairie just outside Medicine Hat in May and June 1944. Migrants are commonly seen on the prairie during late August and early September.

Great Horned Owl

Bubo virginianus. — Quite common resident in windbreaks of abandoned farms, observed as late as November. One seen within Medicine Hat at 7.15 a.m., March 10, 1944.

Snowy Owl

Nyctea nyctea. — Specimens seen on prairie after first spells of severe weather, as on Nov. 24, 1945 and Nov. 19, 1946. One shot on Dec. 15, 1945.

Burrowing Owl

Speotyto cunicularia. — Breeding colonies observed in Twp. 15, R. 7 Twp. 17, R. 7; and Twp. 18, R. 6; being 10, 25 and 35 miles respectively north of the C.P.R. main line, the northern limit recorded by Taverner. A group of 4 was observed in migration 4 miles north of Suffield, August 17 and 18, 1946.

Long-eared Owl

Asio wilsonianus. — Two specimens shot in abandoned farmstead, Sept. 9, 1944.

Nighthawk

Chordeiles minor. — Common in the city of Medicine Hat. Occasional on the prairie, where it has been seen hawking at high noon of a sunny June day.

Belted Kingfisher

Megaceryle alcyon. — Only one specimen seen, on the Saskatchewan River at Medicine Hat, June 9, 1944.

Yellow-shafted Flicker

Colaptes auratus. — A common resident in Medicine Hat. Observed in migration in May and early September, following the telephone poles across the prairie. First record in the 'Hat was April 7, 1946.

Red-shafted Flicker

Colaptes cafer. — A quite common resident in the shadier sections of Medicine Hat.

Hairy Woodpecker

Dryobates villosus. — A migrant pair was observed in Medicine Hat in early April, 1944.

Downy Woodpecker

Dryobates pubescens. — One fall migrant seen in prairie farmstead, Sept. 9, 1944. One winter resident seen in Medicine Hat on Jan. 13, 1946.

Eastern Kingbird

Tyrannus tyrannus. — A common breeding resident in Medicine Hat. Also frequently seen in migration across the prairie in May.

Arkansas Kingbird

Tyrannus verticalis. — A common breeding resident in Medicine Hat and Redcliff, but

never seen on the prairie, even in migration. First recorded arrival, April 20, 1946.

Say's Phoebe

Sayornis saya. — A conspicuous breeding resident, particularly around prairie buildings. First recorded appearance May 11 (1945). Nests with eggs found in buildings on June 3, and 16 (1944). This bird is so tame that a female, kept in a foot-square cage, proceeded to sing therein, and on liberation promptly returned to her nest in the vestibule of an inhabited building and laid 5 eggs.

Least Flycatcher

Empidonax minimus. — A breeding resident, commonly found among the cottonwood shadetrees of Medicine Hat.

Richardson's Peewee

Myiochanes richardsoni. — The plaintive note of this Western Wood Peewee is a characteristic sound of the shadier riverside streets of Medicine Hat in early June.

Olive-sided Flycatcher

Nuttallornis mesoleucus. — One seen along river-bank at Medicine Hat, June 18, 1944.

Horned Lark

Otocoris alpestris. — The most abundant bird of the prairies of this region. Migrants have returned in late February and early March. Fledglings have left the nest by mid-May, although one horned lark was observed to build a nest in June and lay 4 eggs in it. These birds collect into flocks of about 25 in October, and leave in November. However, a pair was seen on Jan. 15, 1944, and several flocks were noted on the prairie in January, 1945.

Bank Swallow

Riparia riparia. — Common along Saskatchewan River at Medicine Hat, nesting in steep clay banks.

Barn Swallow

Hirundo erythrogaster. — Breeding resident, frequent around prairie farmsteads, nesting in barns and abandoned buildings.

American Magpie

Pica pica. — Commonly seen on the outskirts of Medicine Hat, in brushy coulees, and in farm shelterbelts. They may move into the residential districts of the 'Hat in the fall. The young fledglings are ready to fly in mid-June.

American Crow

Corvus brachyrhynchos. — Not commonly seen in Medicine Hat region, and then singly; although flocks are to be seen in irrigated

fields in the adjacent Brooks area. Earliest spring dates are March 23, 1945 and March 28, 1946.

Black-capped Chickadee

Penthestes atricapillus. — A winter resident in Medicine Hat, groups being conspicuous from October to April.

Red-breasted Nuthatch

Sitta canadensis. — Single migrants occasionally seen, the earliest spring date being May 1 (1946). One bird appeared 'out of the blue' at an exceedingly isolated prairie camp on May 28 (1944) and stayed as a friendly guest for a week before moving on; again on Sept. 7 a similar bird appeared at the same spot on his autumn travels.

Brown Creeper

Certhia familiaris. — One seen on shade-tree in Medicine Hat, Nov. 4, 1945; another specimen seen on same street, Jan. 19, 1947.

House Wren

Troglodytes aëdon. — Occasional in Medicine Hat; one nest found in an iron pipe above the river-bank, the female sitting (May 20, 1944).

Catbird

Dumetella carolinensis. — A breeding resident, quite common along the river-banks at Medicine Hat.

Brown Thrasher

Toxostoma rufum. — Occasional resident. A pair was seen in a brushy coulee outside Medicine Hat, June 18, 1944. Six seen in Horticultural Station grounds at Brooks, June 4, 1945. Migrant on prairie.

Robin

Turdus migratorius. — Common breeding resident in Medicine Hat. Absent from prairie farmsteads except in spring and fall migrations. First dates: March 23, 1945; April 1, 1946.

Olive-backed Thrush

Hylocichla ustulata. — Seen and heard in song along river-bank at Medicine Hat; May 21, 1944; May 30, 1945; June 18, 1944 (song).

Mountain Bluebird

Sialia currucoides. — Occasional breeding resident. Sporadic specimens seen in spring: on prairie north of Suffield, — a pair on May 3, 1945 and one on June 13, 1946; one seen at Elkwater in Cypress Hills, June 24, 1945. Flocks of migrants in the fall are conspicuous on the prairie; 15 at isolated camp, Sept. 22, 1944; 7 at Suffield camp, Oct. 7, 1944; 12 in

Medicine Hat, Aug. 24, 1946; 50 at Suffield camp, Oct. 2, 1946.

Ruby-crowned Kinglet

Corthylio calendula. — Two migrants seen at prairie farmstead, Sept. 9, 1944.

Bohemian Waxwing

Bombycilla garrula. — A flock of about 30 were seen on river-bank at Medicine Hat on Feb. 7, 1946.

Cedar Waxwing

Bombycilla cedrorum. — Flocks of this species are quite common in Medicine Hat in May and June.

Common Shrike

Lanius ludovicianus. — The "white-rumped" shrike is quite conspicuous along windbreaks and roads on the prairie, often perching on telephone wires. The same territory is occupied by a pair each year. This species was observed feeding on young horned larks. Earliest date to return, April 5, 1946. What appear to be migrants are in evidence in early August.

Red-eyed Vireo

Vireo olivaceus. — Heard and seen in thick trees in Medicine Hat, May 14 and June 18, 1944.

Warbling Vireo

Vireo philadelphicus. — Heard and seen in high cottonwoods in Medicine Hat, its song forming a characteristic background, in early and middle weeks of June.

Yellow Warbler

Dendroica aestiva. — The only resident warbler, being unusually abundant in the river-bank residential section of Medicine Hat. Earliest return, May 19 (1945).

Black-poll Warbler

Dendroica striata. — Five migrants seen on river-bank at Medicine Hat, May 24 and 25, 1947.

Myrtle Warbler

Dendroica coronata. — Observed as a spring and fall migrant in Medicine Hat and on prairie farmsteads. Spring migration from April 29 to May 6 (1945). Fall migration in late September.

American Redstart

Setophaga ruticilla. — Specimens seen in poplar plantations at the Horticultural Station, Brooks on June 4, 1945.

House Sparrow

Passer domesticus. — Common in all towns along C.P.R. main line. Colonized the new

Suffield camp (isolated by 4 miles of prairie) sufficiently to become major pest in 4 years.

Western Meadowlark

Sturnella neglecta. — Common everywhere on the prairies. First spring migrants: March, 30, 1945 and April 1, 1946. Fall migrations in loose flocks late September and early October.

Yellow-headed Blackbird

Xanthocephalus xanthocephalus. — This striking bird is occasionally found along slough margins in June. A flock of 8 birds appeared at prairie camp on May 11, 1945 and stayed for about a week. A similar flock appeared at the same spot on May 3, 1946.

Red-winged Blackbird

Agelaius phoeniceus. — Common breeding resident in marshes and sloughs. A nest with 4 eggs found in a wild rose bush, June 10, 1944.

Baltimore Oriole

Icterus galbula. — A breeding resident in Medicine Hat, returning in early May. Three breeding pairs noted along half-mile of river-bank street, 1944.

Bullock's Oriole

Icterus bullocki. — Occasional breeding resident in riverside Medicine Hat, its stuttering song much in evidence.

Rusty Blackbird

Euphagus carolinus. — Two migrants stopped at isolated prairie camp on Sept. 22, 1944; one was shot to confirm identification. Spring migrant seen on April 23, 1946.

Brewer's Blackbird

Euphagus cyanocephalus. — Occasional flocks of about 20 each seen around prairie settlements in late April, May and June. Flocks of at least 100 seen on Indian Reserve south of Gleichen, Sept. 7, 1946.

Bronzed Grackle

Quiscalus quiscula. — Evidently rare. A single specimen seen in Medicine Hat flying over Saskatchewan River, April 25, 1946.

Cowbird

Molothrus ater. — Commonly encountered in small flocks around farm buildings on the prairie.

Rose-breasted Grosbeak

Hedymeles ludovicianus. — One specimen observed singing in a park of poplars at the Horticultural Station at Brooks, June 4, 1945.

Lazuli Bunting

Passerina amoena. — Four pairs of this bril-

liant species were located on brushy outskirts of Medicine Hat, June 11 and 18, 1944.

Hoary Redpoll

Acanthis hornemanni. — Three seen in prairie camp, Jan. 10, 1947, after spell of severe weather.

Redpoll

Acanthis linaria. — Small flocks seen in Medicine Hat, Feb. 10, 1946.

Pine Siskin

Spinus pinus. — Single specimen seen at Brooks, June 4, 1945. A flock of about 20 passed rather high overhead at Medicine Hat on Nov. 27, 1946, after a spell of severe weather.

American Goldfinch

Spinus tristis. — Common breeding resident in Medicine Hat and occasional on prairie farmsteads. Flocks of fall migrants seen on prairies in early October.

Red Crossbill

Loxia curvirostra. — A flock of 6 seen in ornamental spruce, Nov. 5, 1944, and a large flock of possibly 50 seen on Dec. 28, 1945, in Medicine Hat.

Spotted Towhee

Pipilo maculatus. — Quite common in brushy coulees along Saskatchewan River 3 miles west of Medicine Hat.

Lark Bunting

Calamospiza melanocorys. — A quite common species on the prairies, singly or in small flocks, returning in mid-May.

Savannah Sparrow

Passerculus sandwichensis. — Breeding pairs seen in long coarse grass around sloughs.

Grasshopper Sparrow

Ammodramus savannarum. — Suspicions of the occurrence of this elusive species were confirmed by observing up to 20 specimens along the Saskatchewan River at Medicine Hat, uttering their characteristic buzz, on May 20, 1945.

Vesper Sparrow

Pooecetes gramineus. — Quite abundant on the prairie in May. Earliest observed return April 25 (1946).

Lark Sparrow

Chondestes grammacus. — Common on outskirts of Medicine Hat, and seen occasionally on prairie farmsteads.

Slate-colored Junco

Junco hyemalis. — Seen only as migrants. Earliest spring date March 31 (1946). Small

flocks of fall migrants were passing through prairie camp from Sept. 6 to 22, with stragglers up to Oct. 8 (1944 observations).

Pink-sided Junco

Junco mearnsi. — Two specimens apparently of this species were seen in Medicine Hat on March 23, 1945.

Tree Sparrow

Spizella arborea. — Seen only in fall migration, when quite common in October. Flocks of 20 or more were seen passing through Medicine Hat on Oct. 15, 1945. Three stragglers were noted at a prairie camp in early November, 1945.

Chipping Sparrow

Spizella passerina. — An occasional breeding resident in Medicine Hat and in brushy sandhills on the prairie. First return noted May 6 (1945).

Clay-colored Sparrow

Spizella pallida. — A not uncommon breeding resident around Medicine Hat and in prairie farmsteads.

White-crowned Sparrow

Zonotrichia leucophrys. — Only spring migrants observed. Observed frequently in Medicine Hat from April 29 to May 13, 1945. First date in 1946 was April 24. First date in 1944 (at Suffield camp) was April 15.

White-throated Sparrow

Zonotrichia albicollis. — Rare. Single mig-

rant observed in isolated prairie camp, May 22, 1944.

Song Sparrow

Melospiza melodia. — Apparently rare. Only one specimen seen, along river-bank at Medicine Hat, May 20, 1945.

McCown's Longspur

Rhynchophanes mccowni. — Fairly common breeding resident on the prairies in early summer.

Chestnut-collared Longspur

Calcarius ornatus. — An abundant and characteristic species of the unbroken short-grass prairie. Small flocks return first in early April (Apr. 11, 1944; Apr. 15, 1946). The black-breasted males are conspicuous in May performing their "swan-dives". Nests are commonly found in June on the bare prairie with little concealment. Four were found in 1943 and 1944 (May 27, June 1, 5 and 11), and three of them each contained 4 eggs. One newly-made nest was watched and was observed to gain one egg every day.

Snow Bunting

Plectrophenax nivalis. — Common winter resident on the prairies. First arrivals from the north appear to be late October, ahead of the permanent snow (Oct. 29, 1944, Nov. 3, 1946). Large flocks of over 100 appear during first spell of severe weather (in late November for 1945 and 1946) and stay in shelter of camp buildings for 1 or 2 weeks.

OTTAWA BIRD RECORDS, 1945¹

A. E. BOURGUIGNON,

Ottawa, Ont.

Branta bernicla.

AMERICAN BRANT. — Two specimens taken, May 26, 1945, the first spring record for the area.

Spatula clypeata.

SHOVELLER. — Two drakes and one duck were seen on Lake Deschenes near Shirley's Bay on April 21. No previous spring records have been noted in the Ottawa district.

Calidris canutus.

KNOT. — One taken at Lake Deschenes on August 20 was presumably the first fall record for the Ottawa district.

Arenaria interpres.

TURNSTONE. — Between May 27 and June

3, twenty-three were seen at Lake Deschenes.

Totanus melanoleucus.

GREATER YELLOW-LEGS. — An early date for the district afforded by three seen at Lake Deschenes, April 18.

Larus philadelphia.

BONAPARTE GULL. — Five were seen at Lake Deschenes on April 18, and specimens taken; an early date.

Richmondia cardinalis.

CARDINAL. — Mrs. A. T. G. Watts of 60 Craig St., the Glebe, Ottawa, reported a cardinal at her feeding station on December 23, and I saw this bird on December 30, 1945. It was a male in good plumage.

¹) Received for publication February 5, 1947.

PISCICOLA PUNCTATA (VERRILL) FEEDING ON THE EGGS OF
LEUCOSOMUS CORPORALIS (MITCHILL)¹

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Wellington, New Zealand.*

CHTHYOBDELLID leeches are best known from accounts of their occurrence as ectoparasites on fish and other aquatic animals while the fact that many of these leeches have periods of free existence has gained little attention. The latter habit has been occasionally recorded for various species but such records have been given little prominence and are generally buried in the literature. At the same time there is evidence indicating that the habit is one which is rather general in the group. Hickman (1942) has recently given an account of the collection of a *Pontobdella* (*P. verrucosa*) along with its cocoons from an empty shell at the water's edge in Tasmania. In 1944, I obtained a specimen of the *G. Ichthyobdella* from a honey-combed rock brought to the surface from 80 fathoms in Cook Strait, N.Z. The well-known fresh-water *G. Piscicola* is a Genus including leeches occasionally found free-living.

Harding (1910) briefly describes the manner in which the European *P. geometra* attaches itself to a host on which it remains for several days feeding on blood obtained chiefly from the fins, and drops off when gorged. Moore (1912) writes that *P. punctata* as well as occurring as an ectoparasite feeding on mucus on the skin of fishes may also "be found living among water plants to the stems of which there is good reasons to believe its stalked cocoons are attached". In his account (Moore, 1924) of the leeches from Lake Nipigon, there is a record as follows "22, Windigo Bay, sandy bottom near shore, twenty-four specimens" of *P. punctata*. Bere (1931) notes that a specimen of "*P. geometra* was recovered from a net". In this instance, the leech may have released its hold on its host during netting operations. Bere remarks further the "*P. punctata* was not found free-living, although it has often been taken independently from its hosts".

Without going further into the literature which is composed generally only of brief and relatively uninformative notes or comment, it is clear from the above that existence away from a host is a more definite habit of these leeches than is commonly appre-

ciated. It is a phase in the life of these leeches for which there is little accurate knowledge or information. The present evidence shows that free existence is at least part of the breeding behaviour since in the better known genera breeding involves the attachment of a cocoon to some foreign object; but apart from this, the habit remains a field still open to investigation. Accordingly it is interesting to report that in May, 1934, when studying the spawning of fishes at Brome Lake in southeastern Quebec, I collected two specimens of a piscicolid leech from a nest of *Leucosomus corporalis* where they were feeding on developing eggs. These specimens showed no indications that they were gravid or had left the host for breeding. Both were obviously gorged on eggs. The color of the eggs could be seen through the skin which was stretched, almost transparent and otherwise colorless.

These specimens are assigned to *Piscicola punctata* (Verrill, 1871) although they both showed a feature similar to one described by Meyer (1940) as characteristic of *P. milneri*. This was the presence in the recently preserved specimens of eight small rather circular patches somewhat of a glandular appearance. These were arranged as a row of four patches in the paramarginal position along either side of the posterior sucker, but neither along the front nor the rear edges. These patches have now completely disappeared. They might be taken for the "oculiform spots" described for *P. milneri* or the paramarginal patches of *P. geometra*; but in all other respects, these specimens are *P. punctata*.

The body is grossly swollen, circular in section but instead of being cylindrical is conical, tapering from a maximum width of 3 mm. just anterior to the posterior end of the body to 0.5 mm. at the base of the anterior sucker. The latter is 0.75 mm. in diameter, ovoidal, and in the one specimen showed two pairs of eyes when examined shortly after preservation. These have now disappeared, while none were visible in the second specimen even shortly after they had been preserved. The posterior sucker is of a size similar to the anterior sucker in one

¹) Received for publication February 7, 1947.

case, and fully contracted in the other. Neither specimen is relaxed or properly expanded. The body is 9.0 mm. in length, but being distended shows no indication of annulation posterior to the male aperture of the genital system. The mouth is situated posterior to the centre of the anterior sucker. The oesophagus terminates at the level of the male aperture. The five pairs of lateral pouches of the stomach increase in size from the anterior to the posterior pair and, like the large diverticulum which extends to the end of the body, are grossly swollen with food. The short intestine is straight and bears four distinct pairs of simple lateral caeca. It enters the rectum which carries several small simple pockets. The six pairs of testes are distorted from a spherical form to a triangular shape by the pressure of the swollen stomach pouches. The vasa deferentia follow an irregular course, coiling at least once before bending ventrally to enter the large and swollen atrium which opens by a very obvious aperture in the usual position. Segments vii to x contain clusters of glands. Other details cannot be determined but in the presence of four definite pairs of simple intestinal caeca, the prominent male genital aperture, coiling vasa deferentia, and other features, it is clear that these are specimens of *P. punctata*.

L. corporalis is a common fish in Brome Lake. In late April and early May, the males run into the outlet and into streams entering the lake. The nest-building of this species has been frequently described (Adams and Hankinson, 1928, etc.). It is a prolonged process, the males individually carrying large pebbles to chosen sites and building a long low mound of pebbles using layer after layer of pebbles and then of finer gravel all of which is carefully selected and diminishes in size as the mound rises. One to three weeks may be spent in this task. Finally, there is a run of females, spawning takes place over the mound, the eggs sink onto and into the mound which is then completed with very fine gravel. In this way the eggs are concealed deep in the mound and protected by gravel from the ordinary range of predators.

Having followed the mound-building, spawning and completion of the nest in several pools on the Fisher Creek about three-quarters of a mile from the lake, the regular collection of developing stages was commenced by carefully spading up the mound and catching eggs and later the larvae—as

they drifted into a net held immediately downstream from the mound. Four nests were treated in this manner, and from one the two leeches were obtained.

This record indicates that *P. punctata*, at least, may have some significance other than as an ectoparasite although it is difficult to assess its value in this respect. These are the only specimens in my collections but this record is of interest in connection with the brief statement by Harding (1910) in his account of *P. geometra* where he points out that this latter species "at times is found in considerable numbers by breeders of trout, when these fish are examined during the spawning season". Meyer (1946) in his original account of *P. salmositica* records that "these leeches congregate in the pond in large numbers during the spawning season of the salmon, most years". *Salvelinus fontinalis* is still present in the Yamaska watershed on which Brome Lake is situated, but I did not have the opportunity to follow up this indication from Harding's and Meyer's papers and examine trout redds during the spawning season.

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NOTES AND OBSERVATIONS

Canadian Record of the Brewster's Warbler (*Vermivora chrysoptera* x *pinus*) at London, Ontario. — On the morning of May 11, 1946, the McIlwraith Ornithological Club held an early morning outing at the "Ponds", one mile south of London, Ontario. This area consists of three small bodies of water surrounded by swampy woodlands; open higher land covered with hawthorns and shrubbery. The author and several members were walking through the woods on the east side of "Saunders' Pond", when, what was thought to be a golden-winged warbler (*Vermivora chrysoptera*), was heard singing. The bird was found in a flowering crab-apple tree but flew before identification could be definitely established. It was noted though that the bird lacked the characteristic black throat of the golden-wing and had a light suffusion of yellow on the breast.

Being somewhat puzzled as to the identification, Peterson's Field Guide was consulted before proceeding. It was at this point that W. G. Girling joined us. He had caught a glimpse of the bird as it searched very close to the ground and sang continuously and had thought it to be a golden-wing. The identification of the bird was discussed at some length and eventually it was concluded that the bird was a Brewster's warbler.

Such a rare find called for further investigation. The party was divided and a search was made of the area. In about three-quarters of an hour the bird was found, feeding and singing intermittently, in the same tree where it had first been seen! It remained feeding quietly in the tree while we studied it for fifteen minutes. All details were carefully noted from about fifteen feet with 8x glasses. The bird had a dark, brownish-grey back; whitish underparts with a yellow suffusion on the breast, the yellow extending along the flanks to the secondaries; a dark stripe through the eye and a light line over the eye, and yellow wing-bars.

On May 14, R. Standfield and others found the bird in the same locality. Mr. Standfield collected it, prepared a study skin, and obtained the following measurements and information: total length, 110 mm.; tail, 43 mm., wing, 64 mm., tarsus, 16.5 mm., sex, male; skull granulated; stomach, small insects. Eventually the skin was taken to the Royal Ontario Museum of Zoo-

logy for verification. It was subsequently learned that, although there are a few sight records, this is the first record substantiated by a specimen, for Canada. The skin is now in the Royal Ontario Museum of Zoology collection.

In the London area, the golden-winged warbler is a fairly common summer resident, the average date of spring arrival being May 11. Saunders and Dale (Trans. Roy. Can. Inst., Vol. 19, Pt. 2, No. 42, p. 226) list two nesting records. The blue-winged warbler is a very rare migrant, there being only one record for Middlesex County. The specimen was collected on May 16, 1932, by A. A. Wood (Saunders and Dale, *loc. cit.*, pp. 248-249). — ALAN LOUGHREY, 786 Wellington St., London, Ont.

A local migration of the brown-headed chickadee in James Bay. — On the morning of September 30, 1947, a very pronounced local migration of chickadees (*Parus hudsonicus*) was observed at the extreme south end of Hannah Bay, near the mouth of the Kesogami River, Ontario. With A. E. Bourguignon and M. D. Spencer, both of Ottawa, I camped from September 22 to October 9 at various places on the coast of James Bay, between the Moose River and the Hannah Bay Bird Sanctuary. We had occupied our camp on the Kesogami River for five days, and had yet to see a brown-headed chickadee. Several black-capped chickadees (*Parus atricapillus*) regularly visited the camp. At 7:30 a.m., as we prepared to break camp, a large number of brown-headed chickadees appeared in a loose flock, calling, occasionally feeding, and steadily moving from north to south through the shrubbery on the west side of the river. About twenty minutes required for the flock to pass. The total number of migrants was estimated to be 150-200. The actions and progress of the chickadees closely resembled those of various species of small birds as I have observed them in migration at Point Pelee, Ontario. The flock was accompanied by ten red-breasted nuthatches (*Sitta canadensis*). No other individuals of the latter species were observed during the entire trip. Following a clear, quiet night, the day of the migration was clear, warm, and the only windless day we enjoyed.

During the next week, which was spent in that area, several brown-headed chickadees were seen, but only in groups of 2 or 3 which

occasionally visited camp. — O. H. HEWITT, Ottawa.

Mass migration of bats; Clarenceville, P.Q., 1931¹⁾. — On September 16, 1931, when travelling with three companions in an open car along a cross-road near Clarenceville, P.Q., a very unusual concentration of bats was observed.

Hundreds of dusky forms, at first thought to be moths, were flying in rather close formation from the top of one large maple to the next in line, suggestive of a flock of birds during autumn migration. The car was stopped directly under the flying horde and it was immediately apparent to all that the flock was comprised not of moths, but bats; a species of medium size, flying too high for a close examination of taxonomic characters. Shifting rapidly from tree to tree in a southerly direction they made progress at the rate of six to eight miles per hour and the flock was followed for one-half mile by car. Because of the peculiar grouping and regrouping movements, no accurate count could be made but the number of individuals was estimated to be four to five hundred. At this point on the Ridge Road, a single row of large sugar maples was present on either side but the bats progressed along the easterly row of trees only.

At the time the bats were encountered, the sun had set but light conditions were still good, although the sky was lightly clouded. The bats were first observed from a distance of about one-quarter mile and the characteristic flocking movements at once were observed to be most unusual.

The Ridge Road, from which these observations were made, occurs on the gently rolling topography between Mississquoi Bay (Lake Champlain) and the Richelieu River near Clarenceville. It is a connecting link between Quebec Highway No. 52 and Vermont Highway No. 104, joining the latter highway at Alburg, Vermont. The bat migration actually occurred along the western side of Mississquoi Bay in southern Quebec at a point several miles north of the Vermont-Quebec boundary. The migration proceeded in a southerly direction but the route and destination can only be conjectured. They could have crossed the isthmus separating Mississquoi Bay from Lake Champlain proper or they could have continued along the "brige-of-islands" route in the direction of

Burlington, Vermont. In any case, the final destination was believed to be far removed from the actual observation point.

Regardless of the relatively long interval which has elapsed since the original observations were made, these notes are presented, at the special request of Dr. H. B. Hitchcock, of Middlebury College, Vermont, who has been studying the habits of bats in this region. Dr. Hitchcock assures the writer that recorded observations on mass bat migrations are rare and of much scientific value. — GEORGE H. HAMMOND, Marmora, Ontario.

Erroneous Use of the Name 'Red-backed Junco'. In view of recent frequent and unfortunate application, by Canadian authors, of the vernacular name 'Red-backed Junco' to the species *Junco oreganus*, it appears desirable to point out the error in such procedure.

'Red-backed Junco' is, and for many years has been, the standard name of a population of juncos of another species, *Junco caniceps dorsalis*, which breeds in New Mexico and Arizona. Since 1886, the American Ornithologists' Union Check-list of North American Birds has continued to apply the vernacular name 'Red-backed Junco' to this subspecies, and an extensive bibliography has thus been built upon this application. Its further use in connection with *Junco oreganus*, the Oregon Junco, can result only in needless confusion and error. — W. EARL GODFREY, National Museum of Canada, Ottawa.

Land Birds at Sea. — The following records are of interest as instances of the occurrence of land birds at sea. The observations were made aboard M. V. "Westerdam", enroute from Rotterdam to New York in 1947.

On October 10, at 43°05' N. and 52°12' W. (approximately 325 statute miles south of St. John's, Newfoundland) a Snow Bunting (*Plectrophenax nivalis*) was noted aboard at 11.45 a.m. E.S.T. The bird stayed aboard for about three hours. The day was clear and the sea was level.

On October 11, at 41°42' N. and 59°54' W., a juvenile Peregrine Falcon (*Falco peregrinus*) was observed, first at 10.00 a.m., E.S.T. The bird flew around the ship throughout the day and roosted on a mast at night (11th-12th), disappearing in the morning. The weather was very clear and the sea very level. — ANTOON DE VOS, Ontario Department of Lands and Forests, Port Arthur, Ontario.

¹⁾ Contribution No. 2511, Division of Entomology, Science Service, Department of Agriculture, Ottawa, Canada.

The Cinnamon Teal in Ontario. — Mr. E. A. Roberts, Game Warden of Kent county, and his brother, Mr. L. E. Roberts of St. Catharines, while duck shooting in October, 1939, at Mitchell's Bay, at the end of concession 12, Kent county, Ontario, shot three male Cinnamon Teals, (*Anas cyanoptera*), from a flock of five. One only was saved; mounted by a French woman in Dover township. It was kept in the home of Mr. Roberts in Chatham until January, 1948, when he loaned the bird to the Chatham-Kent Museum, at which time the record came to light.

This information was submitted to Mr. L. L. Snyder, Assistant Director of the Royal Ontario Museum of Zoology, Toronto, who claimed this to be the first record for Ontario. — A. A. WOOD, Chatham, Ont.

Immature Snowy Egret (?) (*Leucophoyx thula*) at Crescent B.C. — On August 28, 1946, I was watching a flock of ring-billed gulls at the end of Blackie's Spit which is situated at the mouth of the Nicomekl River six miles north of the International Boundary. I noticed a white bird flying in from Boundary Bay. It was something entirely new to me. At first my mind turned to snowy owls and ivory gulls! It passed me at about 50 yards and flew up stream. My prism binoculars, magnification 8, by Ross, London, gave me a very clear view as the afternoon sun was shining full on the bird. Unquestionably it was a small white heron without plumes, as any child could have told with the naked eye.

The bird was entirely white, no markings on the wing tips. In contrast the legs and feet were light orange. There was no black visible to me. There was nothing distinctive about the bill. The bird was decidedly smaller than the great blue herons that were feeding on the mud flats at the same time, and it was larger than the ring-billed gulls.

I understand egrets are apt to wander from their regular range, particularly during the late summer. Taverner (*Auk*, 44: 221. 1927) has recorded this species from Sandy Lake, Alberta. Brooks and Swarth (*Pac. Coast Avifauna*, 17: 128) place the snowy egret in their hypothetical list for British Columbia. Although several species of herons are white in immature plumage, the snowy egret is the only one likely to wander into this Province. They used to breed in Oregon (Gabrielson and Jewett, *Birds of Oregon*, pp. 109-110). On September 16, Miss

Grenfell and Miss Sanderson of Vancouver told me they had seen a strange white bird on Crescent Beach sometime between September 3 and 10, 1946. They were sure it was a white heron. Fannin (Check list of British Columbia birds, p. 14) records that two snowy egrets were taken at Burrard Inlet, May, 1879. The mounted egret in the Provincial Museum, Victoria is said to be a Japanese egret in nuptial plumage. According to Brooks it would be quite impossible (Brooks & Swarth loc. cit.)—M. W. HOLDOM, Crescent, B.C.

Catbird on Vancouver Island, B.C. — The Catbird (*Dumetella carolinensis*) has been recorded from the coastal region of the mainland of British Columbia but, according to Brooks and Swarth (*Pacific Coast Avifauna*, No. 17, p. 112, 1925) there was, then, no definite record of its occurrence on Vancouver Island.

On June 20, 1947, I heard and saw one at Point Holmes, Comox, V.I. The bird was on a southern slope, which is covered with a thick brushy growth, facing the sea. I was first attracted to the bird by its unusual song but the bird was shy and provided only fleeting glimpses.

The evening, of the same day, I went back and had ample opportunity to identify the bird as a catbird; it then sang on an exposed bough so that the distinguishing markings could be plainly seen.

The song was very fine; it generally opened with a perfect imitation of the alarm note of the robin (*Turdus migratorius*). When a killdeer (*Charadrius v. vociferus*) called, nearby, it incorporated this into the song as it did the "chack" note of a Brewer blackbird (*Euphagus cyanocephalus*) when this bird called. There was a russet-backed thrush (*Hylocichla u. ustulata*) singing, on and off, close by, and some of its notes were used by the catbird. Doubtless other notes were introduced as the song was very diversified but I could not identify any (they were not those of local birds). Except when on the exposed bough the bird kept mainly to cover, singing just the same. On these two occasions I never heard the "meouw" note.

The bird was still in the same place and singing well on the morning of June 27 and then brought into its song the "meouw" note but did not mimic any local bird as before (none were calling) but it still opened with the robin note.

On July 3 the bird was still there but the day was stormy and it only warbled occasionally. I did not hear it on subsequent visits.

It is possible that there may have been a movement of catbirds up the coast of B. C. in the spring or early summer of 1947 as specimens were supposedly seen at Victoria, B. C. and White Rock, B. C.; in both cases by a party that knew the bird well.

In the A. O. U. Check list (4th ed.) the breeding range of the catbird is given as "the Transition and Austral zones from central British Columbia, Southern Alberta..." south to "western Washington (rarely)". It is therefore far out of this range to record one as heard at Athabaska Landing, Alberta, on September 12, 1941, when I distinctly heard one "meouwing". — THEED PEARSE, Comox, B. C.

The flora of the Lake St. Clair region of southwestern Ontario. — From the time in boyhood when I determined to find more than the occasional white dog's tooth violet (and find them I did by the hundreds) till the time when I determined to find the green phase of the trillium (and find them I did just recently) one of my greatest interests has been the study of the flora, in whatever locality my wanderings took me, be it northern Ontario or southern Florida.

In view of this natural interest which commenced early in life it is not to be wondered at that when it came to the choice of a life-work I chose a profession in the field of Botany viz. Forestry. The forester, especially the silviculturist, is also a botanist and an ecologist. The herbaceous flora of an area is often dependent on the presence or absence of herbaceous species for site identification and evaluation. This is especially so in regions where agriculture has dealt so ruthlessly with the forest cover (as it has in most of southern Ontario) that more can be learned of the original forest by a study of the persisting minor flora than from the trees which man has seen fit to leave simply because he had no immediate use for them.

Since joining the Ontario Department of Lands and Forests and coming to southern Ontario as Zone Forester I have found the study of the flora of interest and importance in my work. In the past some work has been done by various individuals in writing up

certain groups of the flora of Kent county, or the flora for certain localities but so far as I am aware no organized effort has been made to cover, in a systematic way, the entire field of native and naturalized plants in the St. Clair region of Southern Ontario. It seems to me time that this task was undertaken, as by further delay the past conditions would become more obscure.

Therefore as one who is definitely interested in the work, whose field of labour demands close acquaintance with the flora, and whose activities constantly carry him into the fields and woodlands of the region, I am proposing, with the aid of Dr. Geo. M. Stirrett, to undertake the task of collecting and organizing this information and preparing a manuscript on the "Flora of the Lake St. Clair Region of Southwestern Ontario". A special section on the Fungi will be prepared by Dr. C. C. Bell and another section on the Mosses prepared by C. H. Hand. The area to be covered will be the counties of Essex, Kent and Lambton. We should therefore appreciate hearing from anyone, regarding existing articles or who can furnish first-hand information, regarding this subject.

Proper acknowledgment would be given to all rendering a definite service in this way. — C. HAROLD ZAVITZ, BSF., MF., Forester-in-Charge Chatham Zone, 25 Bedford St., Chatham, Ontario.

A bedbug on a little brown bat. — On August 26, 1947, seven little brown bats (*Myotis lucifugus lucifugus* Le Conte) were collected from a cabin attic at Waterton Lakes National Park, Alberta. When the specimens were examined preparatory to skinning, a bedbug was observed attached behind the ear of one of the bats. The bug has been identified as a bat bedbug (*Cimex pilosellus* Horvath), at the Dominion Forest Insect Laboratory, University of Manitoba, Winnipeg, Manitoba.

This ectoparasite previously has been reported from four American species of bats in the United States (Allen, G. M., Bats, Harvard University Press, 1940). This appears to be the first Canadian record for the bat bedbug and the first record of its occurrence on the little brown bat. — A. W. F. BANFIELD, Dominion Wildlife Service, Ottawa, Ontario.

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OTTAWA, Ontario.



The CANADIAN FIELD-NATURALIST

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Div. of Botany, Central Experimental Farm,
OTTAWA, CANADA

NOTES ON THE HIGHER FUNGI COLLECTED IN LASALLE, QUE., 1930-1940¹

H. A. C. JACKSON

Montreal West, Que.

THE FUNGI reported here were collected during a ten-year period from 1930 to 1940 in a wooded area in the Town of LaSalle, Que., adjacent to the City of Montreal. As this woodland is on the edge of a manufacturing district and is rapidly being cleared, a record of this list might be of interest to mycologists and others.

This little forest comprising roughly half a square mile is located between the Montreal Waterworks Aqueduct on the south and the Lachine Canal on the north. The wood is comprised of deciduous trees and shrubs except for a few scattered hemlocks. The terrain is low and very flat with several ponds and marshy sections. The subsoil is clay with an upper layer of leaf mould.

Very frequent visits were made to this section every year. It was ranged systematically and careful records were kept. Many of the species were found in one restricted location; others were discovered only once. A number of the species the author has not found elsewhere in the Province of Quebec. Therefore this particular and interesting district might be considered unique.

Specimens were determined largely by members of the Division of Botany and Plant Pathology, Central Experimental Farm, Ottawa, and other competent authorities. Those of the rarer species have been deposited in the Mycological Herbarium of the Division.

MYXOMYCETES

Fuligo septica (L.) Weber — On rotting prostrate log; July 1934² appearing nearly every year.

Lycogala epidendrum (L.) Fr. — On rotting prostrate log; Sept. 1931. Common every year.

L. flavo-fuscum (Ehrenb.) Rost. — On rotting prostrate log; Oct. 1935.

Stemonotis fusca Roth. — On rotting prostrate log; Aug. 1937.

ASCOMYCETES

DISCOMYCETES

Operculatae

HELVELLALES

Helvella elastica (Bull.) Fr. — Under mixed hardwood; July 1932, very rarely afterwards.

H. Mitra L. — Under saplings; June 1935, very rarely afterwards.

Morchella esculenta (L.) Pers. — Under deciduous trees; May 1931, 1935, 1936, 1937, 1939, 1940.

Verpa bohemica (Krombh.) Schroet. — Under gray birch; May 1938, only found once.

PEZIZALES

Ascophanus (*Peziza*) *granulatus* (Bull.) Speg. — On cow dung; Nov. 1932.

Patella scutellata (L.) Morgan — On rotting wood; June 1933. Common every year.

Paxina hispida (Schaeff.) Seaver — Under gray birch; Aug. 1935, 1937.

Peziza badia Pers. — On rotting hardwood; July 1931.

P. clypeata Schw. — On rotting stump; Nov. 1931, also 1933, 1935, 1936.

P. repanda Wahl. — On prostrate log; June 1931. Common every year.

P. succosa Berk. — On damp ground; July 1935, also 1936, 1937.

P. venosa Pers. — On ground under hardwood; July 1935.

Plectania coccinea (Scop.) Fuckel — On ground attached to buried branches; May 1933. Common every year.

P. floccosa (Schw.) Seaver — On rotting twigs; June 1933, also 1937.

P. occidentalis (Schw.) Seaver — Rotting maple log; June 1933, also 1934.

Urnula Craterium (Schw.) Fr. — On ground attached to buried sticks; May 1939, found only once.

¹) Received for publication April 18, 1947.

²) The first collection was made in the month and year indicated; collections in later years were not necessarily in the same month.

Inoperculatae

Ascotremella turbinata Seaver — On rotting maple log; Oct. 1931, 1936.

Chlorosplenium aeruginosum (Oed.) de Not. — On rotting wood; Nov. 1932.

Coryne sarcoides (Jacq.) Tul. — On maple log; Oct. 1933, also 1934.

Helotium citrinum (Hedw.) Fr. — On rotten log; Aug. 1931. Collected every year.

Leotia lubrica (Scop.) Pers. — Under gray birch; Oct. 1934, only year collected.

Pezicula carpinea (Pers.) Tul. — On blue beech; Sept. 1935, also 1936, 1937.

Rutstroemia macrospora (Peck) Kanouse apud Wehmeyer. — On rotting stump; Sept. 1938.

PYRENOMYCETES

Cordyceps capitata Link — On *Elaphomyces* sp.; July 1931.

Cordyceps sp. — On June bug.

Daldinia concentrica (Bolt.) Ces. & de Not. — On dead hornbeam; Oct. 1934, 1936.

Hypomyces chrysospermus (Bull.) Tul. — On bolete; July 1931, also 1934.

H. hyalinus (Schw.) Tul. — On agaric; Aug. 1933, also 1937, 1938.

H. polyporinus Peck — On agaric; Aug. 1933, also 1937, 1939.

Hypoxylon coccineum Bull. — On rotting log; Sept. 1937, 1938.

Nectria cinnabarina (Tode) Fr. — On poplar; Sept. 1936. Quite common.

Ustulina vulgaris Tul. — On hardwood stumps; June 1931. Common every year.

Xylaria polymorpha (Pers.) Grev. — On base of dead basswood; Aug. 1933. Common every year.

OTHER ASCOMYCETES

Elaphomyces sp. parasitized by *Cordyceps capitata*. — Under surface of soil; July 1931.

BASIDIOMYCETES

LOWER BASIDIOMYCETES

Auricularia auricularis (S. F. Gray) Martin — On rotting stump; Nov. 1932. Fairly common every year.

Ducrymyces palmatus (Schw.) Bres. — On rotting wood; Nov. 1932. Fairly common every year.

Eridia alba (Lloyd) Burt. — On dead hardwood; July 1934. Several years on same log.

Sebacina incrustans (Pers.) Tul. — At base of various plants; July 1934. Always quite abundant.

Tremella frondosa Fr. — On hardwood fence; Nov. 1937, also 1938.

T. lutescens (Pers.) Fr. — On rotting stump; Sept. 1931. Common.

T. versicaria Sm. — On ground under saplings; July 1934, also 1935, 1937, 1939.

Tremellodendron sp. — Very common on ground under second growth; June 1934. Collected every year.

HIGHER BASIDIOMYCETES

Thelephoraceae

Hymenochaete tabacina (Sow.) Lev. — On dead maple branches; June 1934. Common every year.

Peniophora aurantiaca Bres. — On alder; Sept. 1934. Common every year.

P. cinerea (Pers.) Cooke — On alder; Sept. 1934. Common every year.

Stereum diaphanum (Schw.) Cooke — On ground under maple; June 1934. Regularly, but only in a small area.

S. fasciatum Schw. — At the base of dead elm; Aug. 1931. Always common.

S. purpureum Pers. — On dead poplar; Aug. 1933. Always common.

S. rameale Schw. — On dead maple log; June 1934. Always common.

S. sericeum Schw. — On dead branches; July 1930. Always common.

Hydnaceae

Calodon zonatus (Batsch ex Fr.) Quélet — Under gray birch; Aug. 1934, also 1937.

Hericium Caput-Ursi (Fr.) Banker — On rotting American beech; Sept. 1934. Collected nearly every year.

H. coralloides Scop. ex S. F. Gary — On rotting American beech; Sept. 1934. Collected nearly every year.

Phellodon amicus (Quélet) Banker — Under gray birch; Sept. 1936. Collected several years on same place.

Phlebia sp. — On rotting basswood stump; Sept. 1936. Found often; quite common.

Steccherinum ochraceum (Pers. ex Fr.) S. F. Gray. — On prostrate logs; Sept. 1936, 1937.

Steccherinum sp. — On rotting log; Sept. 1931.

Clavariaceae

Clavaria amethystina (Batt.) Pers. — Under young hardwood; June 1935, also 1939. Uncommon.

C. citriceps Atk. — Under young hardwood; June 1935, also 1936, 1937, 1940. Common.

C. cristata (Holmsk.) Fr. — On prostrate logs; July 1934. Abundant every year.

C. fusiformis Sowerby — Under saplings; July 1934. Common.

C. helveola (Pers.) Fr. — Under second growth; June 1938.

C. Kunzei Fr. — Under hardwood; Aug. 1935, also 1937, 1939, 1940.

C. ligula (Schaeff.) Fr. — Under second growth; July 1935. Uncommon in these woods.

C. stricta (Pers.) Fr. — On rotting log; Sept. 1938.

C. vermiculata Micheli — Under saplings; Aug. 1931. Abundant nearly every year.

Physalacria inflata (Schw.) Pk. — On rotting logs; Aug. 1931. Abundant nearly every year.

Boletaceae

Boletinus porosus (Berk.) Pk. — Usually contiguous to ash; July 1930. Very abundant every year.

Boletus bicolor Pk. — Under deciduous trees; Aug. 1936, 1939, 1940.

B. chrysenteron (Bull.) Fr. — Under gray birch; Aug. 1933, 1937. Rather rare.

B. edulis (Bull.) Fr. — Under gray birch; July 1930. Common every year.

B. felleus (Bull.) Fr. — Under American beech; Sept. 1939, 1940. Uncommon.

B. glabellus Pk. — Mostly under gray birch; Sept. 1937, 1939. Uncommon.

B. ornatipes Pk. — Under American beech; Aug. 1937. Collected only once.

B. piperatus (Bull.) Fr. — Under gray birch; July 1932. Common every year.

B. rubeus Frost — Under deciduous second growth; Aug. 1937, 1938. Collected only twice.

B. scaber (Bull.) Fr. — Under gray birch; June 1930. Most common.

Polyporaceae

Daedalea confragosa (Bolt.) Fr. — On alder and birch; Sept. 1930. Common.

D. quercina (L.) Fr. — On oak stumps; Oct. 1930. Common; on oak only.

D. unicolor (Bull.) Fr. — On birch; July 1934. Common every year.

Favolus canadensis Kl. — On dead oak branch; June 1934. Common every year.

Fomes applanatus (Pers.) Wallr. — On maple; June 1930. Always abundant.

F. conchatus (Pers.) Gill. — On maple log; Oct. 1934, 1937, 1938.

F. connatus (Weinm.) Gill. — On maple; Sept. 1937, 1939, 1940.

F. fomentarius (L.) Gill. — On American Beech; Sept. 1930. Found every year.

F. igniarius (L.) Gill. — On hornbeam; Jan. 1933, 1937. Fairly common.

F. pinicola (Sw.) Cooke — On hemlock; Sept. 1937, 1938, 1939 on same log.

Ganoderma lucidum (Leyss) Karst. — On hemlock; Sept. 1936. Rare in these woods.

Lenzites betulina (L.) Fr. — On gray birch; Oct. 1934. Collected every year.

L. saepiaria (Wulf.) Fr. — On hemlock; June 1934. Uncommon in these woods.

Merulius tremellosus (Schr.) Fr. — On rotting basswood; Aug. 1934 and every year.

Polyporus adustus (Willd.) Fr. — On maple; Aug. 1933 and every year.

P. betulinus (Bull.) Fr. — On gray birch; Sept. 1930 and every year. Common.

P. brumalis (Pers.) Fr. — On rotting maple log; Oct. 1930 and every year. Common.

P. cinnabarinus (Jacq.) Fr. — On yellow birch log; June 1932 and every year. Common.

P. cinnamomeus (Jacq.) Sacc. — On mossy ground; Aug. 1935. Only one collection made; rare.

P. conchifer (Schw.) Fr. — On dead elm branches; Aug. 1930. Common every year.

P. elegans (Bull.) Fr. — On basswood log; Sept. 1930. Common every year.

P. fibrillosus Karst. — On gray birch only; July 1935. Common every year.

P. fumosus (Pers.) Fr. — On dead maple; Sept. 1935, 1937.

P. hirsutus (Wulf.) Fr. — On yellow birch log; Oct. 1931. Common.

P. melanopus (Swartz) Fr. — On ground attached to dead wood; Oct. 1934, 1937. Collected only twice.

P. pargamenus Fr. — On maple; Aug. 1932. Fairly common always.

P. picipes Fr. — On birch log; June 1930 and every year.

P. radiatus (Sow.) Fr. — Base of dead gray birch; Sept. 1935, 1937. Rather rare.

P. radicans Schw. — Attached to buried roots; Sept. 1937. Very rare, collected only once.

P. resinosus (Schr.) Fr. — On basswood; Oct. 1930. Abundant every year.

P. Schweinitzii Fr. — At base of white pine stump; July 1930. Several years on same spot.

P. spumeus (Sow.) Hornem. — On dead basswood; June 1934 and every year.

P. squamosus (Huds.) Fr. — On dead elm; June 1930 and every year.

P. sulphureus (Bull.) Fr. — On red oak; May 1934. Collected only once.

P. Tulipiferae (Schw.) Overh. — On alder; June 1933. Common every year.

P. umbellatus (Pers.) Fr. — On ground under gray birch; June 1933, 1935, 1936 on same location. Rare.

P. versicolor (L.) Fr. — On maple; Sept. 1930. Common every year.

Poria ambigua Bres. — On ground; Sept. 1936.

Trametes mollis (Sommerf.) Fr. — On rotting log; Oct. 1934, 1935 on same log.

T. sepium Berk. — Underside of fence rail; Oct. 1933.

T. variiformis Pk. — On rotting log; Oct. 1934.

Agaricaceae

Agaricus campestris Fr. — In pasture at edge of woods; Oct. 1932, 1934, 1936.

A. placomyces Pk. — Under hawthorn; July 1936, 1937.

Amanita caesarea Fr. — Under mixed deciduous woods; abundant in 1933, 1935, also collected in 1934, 1936 and 1937.

A. Frostiana Pk. — Under mixed deciduous woods; Aug. 1935, 1936, 1937, 1939, 1940.

A. muscaria (L.) Fr. — Under mixed deciduous woods; July 1930. Collected every year.

A. phalloides Fr. — Under mixed deciduous woods; July 1932. Appeared every year.

A. rubescens Fr. — Under mixed deciduous woods; Aug. 1933, also 1936, 1937, 1938.

A. verna Fr. — Under mixed deciduous woods; Aug. 1933. Rare, collected once only.

Amanitopsis strangulata Fr. — Under second growth mostly; Aug. 1934. Fairly abundant.

A. vaginata Fr. — Under second growth mostly; June 1930. Abundant every year.

Armillaria mellea Fr. — At base of trees; Sept. 1930. Abundant every autumn.

Cantharellus aurantiacus Fr. — Under open woods. Oct. 1934, 1936. Uncommon.

C. cibarius Fr. — Under open woods; June 1930. Common every year.

Claudopus nidulans Fr. — On prostrate rotten logs; Oct. 1934, 1937, 1939.

Clitocybe albissima Pk. — On ground under open woods; July 1930, 1934, 1935. Fairly rare.

C. dealbata Fr. — On ground under open woods; July 1934, 1936.

C. illudens Schw. — On rotten elm stumps; July 1931, 1933. Collected twice only, rare.

C. infundibuliformis Fr. — Under open deciduous woods; July 1934, 1936. Fairly common.

C. odora var. *viridis* Fr. — Under open deciduous woods; Oct. 1931. Great abundance, one year only.

Clitopilus abortivus Berk. & Curt. — Mostly under second growth; Sept. 1934. Common every year.

Collybia confluens Fr. — Mostly under second growth; Aug. 1933. Rare in these woods.

C. hygrophoroides Pk. — Mostly under second growth; July 1937, 1938.

C. platyphylla Fr. — At base of rotting stumps; July 1930. Always abundant every year.

C. radicata Fr. — At base of rotting stumps; July 1930. Always abundant every year.

C. velutipes Fr. — On dead stumps; Sept. 1931. Found every year.

C. zonata Pk. — On ground under open woods; Oct. 1934, 1935, 1936. On one location only.

Coprinus atramentarius Fr. — Open locations; Oct. 1934, 1937, 1938.

C. ebubosus Pk. — On rotting wood; Sept. 1934, 1936 on same location.

C. ovatus Fr. — On rotting wood; July 1938.

C. micaceus Fr. — At base of hardwood trees; May 1934, 1936, 1937. Common.

C. plicatilis Fr. — On open damp ground; July 1936.

Cortinarius alboviolaceus Fr. — Under open hardwood; Sept. 1934. Collected every year.

C. bolaris Fr. — Under open hardwood; Aug. 1933, 1935. Not common.

C. cinnamomeus Fr. — Under open hardwood; Sept. 1936, 1939. Not common.

C. distans Pk. — Under open hardwood; June 1934, 1936, 1937.

C. lilacinus Pk. — Under open hardwood; Oct. 1938. Uncommon.

C. mucifluus Fr. — Under open woods; Oct. 1933, 1934, 1936, 1937.

C. saturninus Fr. — Under open woods; Sept. 1938. Collected once.

C. semisanguineus (Fr.) Kauffm. — Open woods; Aug. 1933, 1935, 1936.

Crepidotus fulvotomentosus Pk. — On rotting maple stump; June 1934. Collected every year.

C. malachius Berk. & Curt. — On rotting basswood; June 1933. Collected every year.

C. stipitatus Kauffm. — Under leaves attached to sticks; April 1938. Collected only once.

Entoloma grande Pk. — Under open hardwood; Aug. 1930, 1937, 1939.

E. Grayanum Pk. — Under open hardwood; June 1934. Fairly common.

E. rhodopolium Fr. — Under open hardwood; Sept. 1935. Fairly common.

E. strictius Pk. — Under mixed woods; June 1937, 1939.

Flammula magna Pk. — On rotting stump; June 1934, 1935, 1940.

F. polychroa Berk. — On rotting stump; June 1934, 1936, 1937.

- Gomphidius* sp. — On ground; Oct. 1934. Collected only once.
- Hebeloma crustuliniforme* Fr. Under open woods in rings; Aug. 1933.
- Hygrophorus chlorophanus* Fr. — Moist ground; June 1930. Collected every year.
- H. coccineus* Fr. — Open woods; Oct. 1934. Collected every year.
- H. conicus* Fr. — On moist ground; Aug. 1933. Collected every year.
- H. eburneus* Fr. — Under gray birch; Oct. 1933, 1937, 1939, 1940.
- H. flavodiscus* Frost. — Under gray birch; Oct. 1934, 1937.
- H. miniatus* Fr. — Under open woods; April 1933. Common every year.
- H. pallidus* Pk. — Under open woods; Oct. 1934. Collected only once.
- H. pratensis* Fr. — Open location; Oct. 1934, 1937.
- H. psitticinus* Fr. — In mosses; June 1933, 1935, 1936, 1939.
- H. puniceus* Fr. — Under open woods; Oct. 1930. Collected every year.
- Hypholoma appendiculatum* Fr. — Around hardwood stumps; Sept. 1938, 1939.
- H. incertum* Pk. — In open location; June 1934. Common every year.
- H. lacrymabundum* Fr. — Under hardwood; Aug. 1936. Collected once only.
- H. rugocephalum* Atk. — On damp ground; July 1938, 1939.
- H. sublateritium* Fr. — Caespitose around stumps; Sept. 1930. Abundant every year.
- Inocybe flocculosa* Berk. — Under gray birch; June 1933, 1937, 1939.
- I. geophylla* Fr. — Under gray birch; Sept. 1934. Common every year.
- I. lilacina* Fr. — Under gray birch; Sept. 1934. Common every year.
- I. rimosa* Fr. — Under open hardwood; Aug. 1931, 1934, 1935.
- Laccaria laccata* (Scop.) Berk. & Br. — Under open woods; Aug. 1930. Very common every year.
- L. ochropurpurea* Berk. — Under open woods; Aug. 1933. Uncommon.
- Lactarius controversus* Fr. — Under mixed hardwood; Sept. 1938, 1940. Uncommon.
- L. deceptivus* Pk. — Under mixed hardwood; Sept. 1934, 1935, 1939. Very common.
- L. fuliginosus* Fr. — Under mixed hardwood; Aug. 1937. Collected only once.
- L. griseus* Pk. — Under mixed hardwood; July 1934, 1935.
- L. hygrophoroides* Berk. & Curt. — Under second growth; July 1936, 1937. Uncommon.
- L. hysginus* Fr. — Under second growth; Sept. 1935, 1937, 1939.
- L. maculatus* Pk. — Under American beech; Sept. 1935, 1936, 1937.
- L. piperatus* Fr. — Under saplings; Oct. 1931, and every year.
- L. pyrogalus* Fr. — Under saplings; July 1938, 1939, 1940.
- L. subdulcis* Fr. — Under open hardwood; Sept. 1930. Common every year.
- L. torminosus* Fr. — Under open hardwood; Sept. 1932, 1935, 1937.
- L. trivialis* Fr. — Under open hardwood; Oct. 1934, 1937, 1939. Common.
- L. vellerius* Fr. — Under open hardwood; Sept. 1935, 1938, 1939, 1940.
- L. volemus* Fr. — Under open hardwood; Sept. 1932, 1937, 1938.
- Lentinus vulpinus* Fr. — On rotting hardwood log; Oct. 1935, 1936, 1937. Uncommon.
- Marasmius epiphyllus* Fr. — Attached to dead leaf stems; Aug. 1937. Collected only once.
- M. resinosus* (Pk.) Sacc. — Attached to twigs; Sept. 1940. Collected only once.
- M. rotula* Fr. — Attached to twigs; June 1932. Collected every year.
- M. scorodonius* Fr. — On decayed branches on ground; June 1930. Collected every year.
- Mycena acicula* Fr. — On rotting wood; June 1934. Collected once only.
- M. cyanothrix* Atk. — Decayed wood on ground; June 1938, 1939.
- M. galericulata* Fr. — On rotting maple stump; April 1930. Collected every year.
- M. haematopa* Fr. — On rotting wood; June 1934. Collected every year.
- M. Leajana* Berk. — On rotting wood; June 1932. Collected every year.
- M. leptcephala* Fr. — Debris on ground; Oct. 1937, 1939. Uncommon.
- M. polygramma* Fr. — Base of rotting log; June 1935, 1937, 1939.
- M. vulgaris* Fr. — On leaf stems; Aug. 1932. Collected only once.
- Naurocia lignicola* Pk. — On rotting stump; May 1936, 1939, 1940.
- Naucoria* sp.; June 1935.
- Nyctalis asterophora* Fr. — On *Russula* sp.; June 1935, 1936. Rare.
- Omphalia campanella* Fr. — On rotting stump; June 1930. Very abundant every year.
- O. fibula* Fr. — In mosses on log; June 1937, 1939, 1940.
- Panaeolus retirugis* Fr. — On horse manure; July 1936, 1940.

Panus rudis Fr. — On maple stump; June 1934, 1936, 1937.

P. stipticus Fr. — On birch stump; Sept. 1932. Abundant every year.

P. sp. — Very similar to *P. rudis* but caps glabrous; June 1933, 1934.

Paxillus involutus Fr. — On ground under gray birch; Sept. 1934. Abundant every year.

Pholiota adiposa Fr. — On elm; Sept. 1933. Collected every year.

P. marginata Fr. — On rotting log; Sept. 1934, 1936, 1937, 1938.

P. squarrosoides Pk. — On maple; June 1932. Abundant every year.

Pleurotus ostreatus Fr. — On rotting log; May 1934. Abundant every year.

P. sapidus Kalchbr. — One rotting maple; June 1931. Abundant every year.

P. serotinus Fr. — On rotting maple; Oct. 1930. Abundant every year.

P. ulmarius Fr. — On living elm; Oct. 1933, 1934, 1938, 1939.

Pluteus admirabilis Pk. — On rotting wood; June 1933, 1934, 1939, 1940.

P. cervinus Fr. — On dead maple stump; July 1932. Collected every year.

P. granularis Pk. — On rotting basswood; Sept. 1934. Collected every year.

P. salicinus Fr. var. — On rotting stump; Aug. 1934, 1936, 1937.

Psathyrella disseminata Fr. — At base of rotting stump; June 1932, 1933, 1934.

Russula alutacea Fr. — Under gray birch; July 1936, 1937, 1939, 1940.

R. atropurpurea Pk. — Under hardwood; Aug. 1933. Collected every year.

R. densifolia Secr. — Under gray birch; July 1935, 1936.

R. flava Rom. — Under mixed hardwood; June 1934, 1935, 1936, 1940.

R. foetens Fr. — Under gray birch; July 1930. Abundant every year.

R. Mariae Pk. — Under open hardwood; June 1934. Abundant every year.

R. pectinata Fr. — Under open hardwood; Aug. 1936. Fairly common.

R. variata Bann. & Pk. — Under open hardwood; July 1934. Collected every year.

Schizophyllum commune Fr. — On dead elm twigs; June 1930. Collected every year.

Stropharia semiglobata Fr. — On horse manure; Aug. 1930. Collected every year.

Tricholoma panaeolum Fr. var. *caespitosum* Bres. — Open woods; Oct. 1934.

T. personatum Fr. — Under hardwood; Oct. 1940. Not common in these woods.

T. rutilans Fr. — On dead stump; June 1934, 1936.

Trogia crispa Fr. — On birch; Oct. 1936, 1938, 1940.

GASTEROMYCETES

Calvatia gigantea (Batsch ex Pers.) Lloyd — On ground under saplings; Sept. 1932, 1933, 1934, 1938.

Crucibulum vulgare Tul. — On rotting wood; Aug. 1933, 1934, 1936.

Dictyophora duplicata (Bose) Fisch. — Under maples; Oct. 1934. Collected every year.

Lycoperdon gemmatum (Batsch) Fr. — On ground; Sept. 1931. Collected every year.

L. pyriforme Schaeff. — On rotting logs; Aug. 1931. Collected every year.

Melanogaster variegatus (Vittad.) Tul. — In rotting stump; Aug. 1933. Once only collected.

Mutinus caninus (Huds. ex Pers.) Fr. — Base of ash stump; July 1934, 1935, 1936.

Scleroderma tenerum Berk. & Curt. — Under mixed woods; Aug. 1937. Only collected once.

S. vulgare Hornem. — On rotting stump; Sept. 1938, 1939.

FUNGI IMPERFECTI

Ozonium of sterile mycelia. — On rotting hickory; Oct. 1934.

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LOWER CAMBRIAN FAUNA OF THE MONKTON FORMATION OF VERMONT¹

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City College of New York.

INTRODUCTION

THE PRESENT PAPER describes a fauna uncovered from the Monkton quartzite of Vermont. This was discovered by Paul Tasch during the City College Field Course in Geology of 1947. In company with C. G. Doll of the University of Vermont the first fossils were brought into camp. Subsequently Mr. Tasch revisited the area with George Herman who found a singular specimen. At the end of the season the two authors added considerably to the original collection. Previous references in the literature to this Lower Cambrian formation do not locate any specific fossil locality within it, nor has a "Monkton" fauna heretofore been described.

North of Mallett's Bay, the Monkton quartzite of Lower Cambrian age lies beneath Winooski dolomite, and overlies the Mallett facies of the Dunham dolomite. The Monkton disappears northward and in Milton township the Parker slate "which occupies about the same stratigraphic position as the Monkton" (Cady, 1945, p. 526) intervenes between the Dunham and the Winooski.

The Monkton has heretofore yielded few fossils. Keith (1932, p. 369) reported a few Lower Cambrian fossils from the upper Monkton but did not describe these or place the localities on a map. The possibility has been expressed that such fossils reported from the Monkton might belong to the overlying Winooski dolomite (Resser and Howell, 1938, p. 202). However, as yet, fossils from the Winooski are unknown (Cady, 1945, p. 533).

Perkins (1908, p. 232; 1915, p. 201) reported *Olenellus thompsoni* from the grey quartzites "north of Mallett's Bay inland between the bay and the Lamoille River", and below these layers and to the west, *Ptychoparia adamsi*.

Whether Perkins referred to the lower Monkton is not known since his fossil localities were broadly referred to the "Red Sandrock" and were not located on a map.

Other evidence strongly suggests that the new fossil locality (Fig. 1, p. 134), was not known to Perkins. He noted "the entire separation of *Olenellus* and *Ptychoparia* in these layers" and the absence of all other species. Both of these observations differ from those made by the writers. *Olenellus* and *Ptychoparia* occur together (not uncommonly on the same slabs), and several other species, described below, were found. In addition, there was no sign of the locality having been worked before.

Lower Cambrian fossils from Vermont have previously been described from the shales at Parker's Quarry, near Georgia, Franklin County. Among the trilobites of the Parker fauna that Walcott lists are: *Mesonacis vermontana* Hall, *Olenellus thompsoni* Hall, *Ptychoparia adamsi* Billings, and *Corynexochus capito* Walcott. These have also been found in the Monkton formation by the writers.

PRESERVATION

The Monkton fauna was uncovered from a knoll at a 300 foot elevation. An occasional, displaced, yellow-weathered rock along the slopes yielded the characteristic fauna of the higher elevation. While most of the fossils came to light where weathering had penetrated to measurable depth in dolomitic quartzite rocks, some fossils were found on quartzite slabs.

The state of preservation of the fauna ranged from fair to poor. No complete trilobite individuals were found. Entire trilobite cephalae were rare, though parts showing genal spines, glabella, and pleural

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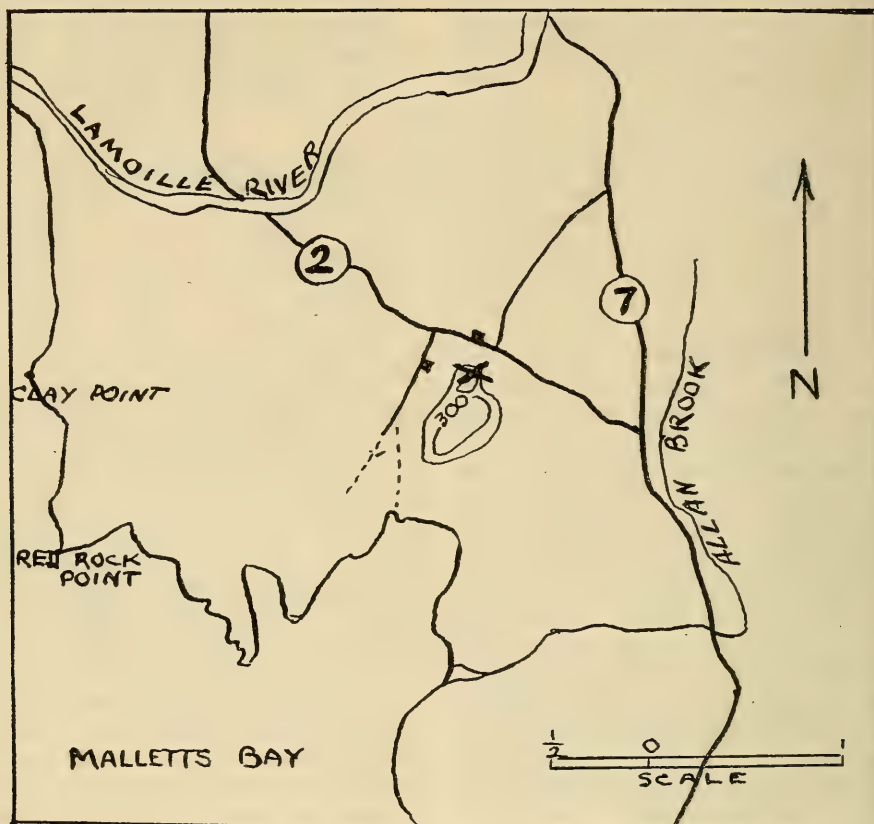


Fig. 1. Point "X" indicates edge of knoll of Monkton quartzite at which the Monkton fauna was found. (Cf Cady, 1945, Plate 10.) Interstate highways Number 2 and 7; the Lamoille River to the North; Allan Brook to the East, and Malletts Bay to the South, place the locality. A few contour lines near the fossil locality are shown, all others are omitted.

spines were common. *Bonnia cephal*a and pygydia were common. Brachiopods and gastropods were both scarce and poorly preserved.

THE MONKTON FAUNA

The Monkton fauna which we collected at the locality shown in Fig. 1 consists of the following species:

TRILOBITES

- Olenellus vermontanus* (Hall)
- Olenellus thompsoni* (Hall)
- Olenellus hermani* Kindle & Tasch, n. sp.
- Olenellus*, sp. undet.
- Antagmus adamsi* (Billings)
- Antagmus typicalis* Resser
- Bonnia swantonensis* Resser

BRACHIOPODS

- Kutorgina cingulata* (Billings)
- Nisusia festinata* (Billings)

- Paterina* cf. *swantonensis* Walcott
- Acrotreta*, sp. undet.

GASTROPODS, ETC.

- Helcionella*, sp. undet.
- Hyolithes*, sp. undet.
- Scolithus*

STRATIGRAPHIC CORRELATIONS

The finding of several species of the Parker fauna in undoubted Monkton layers, supports Cady's observation (1945, p. 531) derived from stratigraphic evidence, that "the Monkton lies at about the horizon of the Parker slate." The species common to the two formations are: *Olenellus thompsoni* Hall, *Olenellus vermontanus* Hall, *Antagmus adamsi* (Billings), and *Corynexochus capito* Walcott (= *Bonnia swantonensis* Resser).

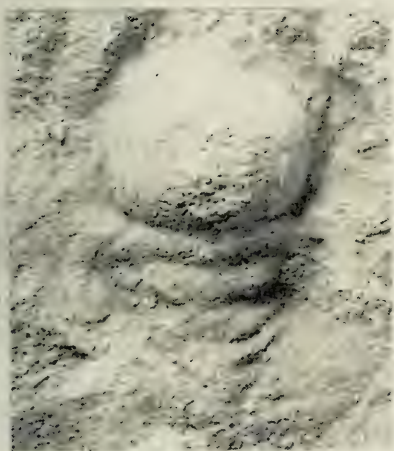
The long-range correlation of the Monkton



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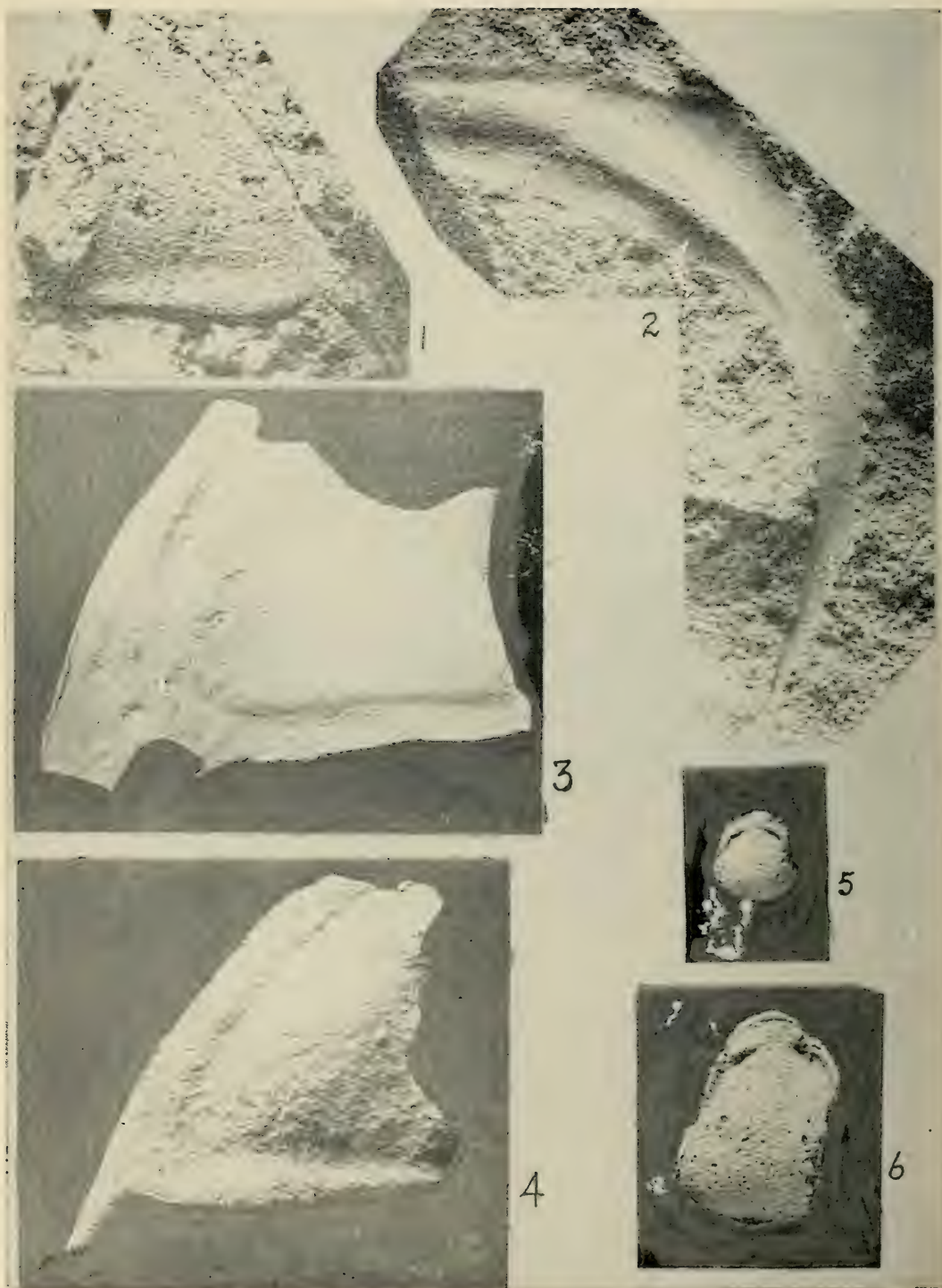
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Kindle and Tasch, Plate 2

formation of Vermont and the Antietam formation of the Southern Appalachians (Resser and Howell, 1938, p. 203), questioned by Cady

on stratigraphic grounds, seems vulnerable on paleontologic evidence as well. Resser's faunal zones (1938, p. 20) are given below:

| Formation | Faunal Zone | Other Fauna |
|-------------------------|-------------|---------------------------|
| ROME—red shales — — — — | Kochiella | Hyalithes wanneri (p. 23) |
| | Olenellus | Bonnia (p. 21) |
| SHADY—dolomite — — — — | Kootenia | Kutorgina, Hyalithes, |
| | Bonnia | Scolithus. |
| ANTIETAM—gray to brown | Obolella | Olenellus, Hyalithes, |
| sandstone — — — — | | Scolithus. |

The faunal zone characteristic of the Shady dolomite is the *Bonnia*. Resser (1938, p. 21) reports that *Bonnia* is also found in the lower Rome formation. No *Bonnia*, however, is reported from the Antietam, which Resser tentatively correlated with the Monkton. On the other hand, the Monkton yields both *Olenellus* and *Bonnia*, as does the lower Rome formation. This is of interest since Resser and Howell placed the Parker of Vermont as equivalent to the Rome (referring to the *Olenellus* fauna).

As noted by Cady, the lower Monkton quartzite correlates with the Parker slate of Vermont and the latter is equivalent to the Rome according to the long-range correlation of Resser and Howell. It then follows that the lower Monkton is also equivalent to the lower Rome. But this disproves Resser's correlation of the Monkton and the Antietam. However, no certainty can be attached to correlations of this kind since *Olenellus* or *Bonnia* are found in all three of the above formations.

The Forteau formation of Labrador yields a fauna closely paralleling that of the Monkton. Among other fossils found in the Forteau are the trilobites, *O. thompsoni*, *O. vermontanus*, *Bonnia parvulus*, and *Bonnia senectus*; the brachiopods, *Kutorgina cingulata*, *Paterina labradorica*, and *Nisusia*; and *Hyalithes* and *Helcionella*.

DESCRIPTION OF SPECIES^{*}

TRILOBITA

Olenellus Hall 1862

Four species of *Olenellus* are included in the collection, consisting of two species previously described, one species undetermined, and one new species. The absence of complete individuals would indicate that the fossils collected represent, not parts of

the animals' exoskeletons, but rather, fragments of the early moltings of growing individuals. No *Olenellus* pygidia were found. Incomplete cephalae, glabellae, and spines were commonly found on the same slab pressed over or penetrating one another. Glabellar furrows, palpebral lobes, genal spines, and genal angles were among the clearest features discernible in the specimens at hand. The frontal lobe of the glabella, while identifiable, was invariably found to be crushed in *O. thompsoni* and *O. vermontanus*. However, a few instances of excellently preserved and uncrushed glabellae were found.

Olenellus thompsoni Hall

Pl. 1 Fig. 4;

Pl. 2 Fig. 4

- Olenus thompsoni* Hall, N.Y. State Cab. Nat. Hist. 12th Ann. Rpt. 1859 p. 59 Fig. 1.
Olenellus thompsoni (Hall), N.Y. State Cab. Nat. Hist. 15th Ann. Rpt. 1862 p. 114.
Olenellus thompsoni (Hall), Walcott (part), U.S. Geol. Surv. Bull. 30, 1886, p. 167, pl. 17 Figs. 2, 4, 9.
Olenellus thompsoni (Hall), Walcott (part), Smithsonian Misc. Coll. vol. 53, No. 6, 1910, p. 336, pl. 34 Fig. 9.
Paedeumias transitans Walcott (part) Smithsonian Misc. Coll. vol. 53, No. 6, 1910, p. 305, pl. 3 Fig. 1; pl. 44 Fig. 7.
Olenellus thompsoni (Hall), Resser and Howell, Bull. Geol. Soc. of A., vol. 49, No. 2, Feb. 1938, p. 219-220 pl. 3 Fig. 17-19.
 As noted by Walcott (1910, p. 338), "It is quite probable that the separated cephalons of *Mesonacis* (= *Olenellus*) *vermontana* may be taken for those of *O. thompsoni* when the thorax is broken away." Billings, much earlier, had differentiated parts of glabellae and cephalae collected from Anse au Loup into *O. thompsoni* and *O. vermontanus*. Unfortunately, he did not give his criteria.

² The specimens described in this paper are in the private collection of Cecil H. Kindle.

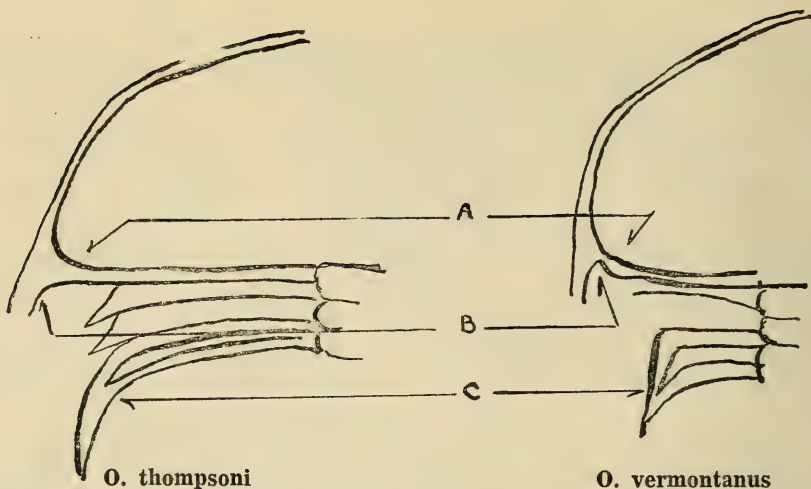


Fig. 2. Diagnostic differences in the cephalo and pleural segments of *Olenellus vermontanus* and *O. thompsoni*. A.—Marginal furrow in genal angle has sharper angle in *O. thompsoni* than in *O. vermontanus*. B.—Reentrant angle between genal spine and posterior border of cephalon found in *O. vermontanus* but is absent in cephalo of *O. thompsoni* in this collection. C.—Third pleural spine curves backwards in *O. thompsoni* but the anterior margin in *O. vermontanus* shows an almost right-angle backward turn.

The only diagnostic difference in the cephalo of the two species that Walcott mentions is that the glabella of *O. thompsoni* is some distance from the marginal rim—a feature also characteristic of *Paedeumias* (Resser and Howell, 1938)—while that of *O. vermontanus* touches the anterior marginal rim.

Careful study of the specimens at hand establishes three diagnostic features which differentiate the cephalo and third pleural spines of the two species. (Fig. 2).

Olenellus vermontanus (Hall)

Pl. 1 Fig. 5, 6

Olenus vermontana Hall, N.Y. State Cab. Nat. Hist. 12th Rept. 1859, p. 60, Fig. 2.

Mesonacis vermontana Walcott, Am. Jour. Sci., 3d ser., vol. 29, 1885, p. 329 Figs. 1, 2.

Mesonacis vermontana Walcott, U.S. Geol. Surv. Bull. 30, 1886, p. 158, pl. 24 Figs. 1, 1a, 1b.

Mesonacis vermontana Walcott (part) Smithsonian Misc. Coll., vol. 53, No. 6, 1910, p. 264, pl. 26 Figs. 1, 2.

Olenellus vermontanus (Hall), Resser and Howell, Bull. Geol. Soc. of A., vol. 49, No. 2, Feb. 1938, p. 220-221 pl. 4, Figs. 15, 16.

Resser and Howell (1938, pp. 220-221) give the following differences as diagnostic fea-

tures of cephalo and pleural spines of the two species, *O. vermontanus* and *O. thompsoni*.

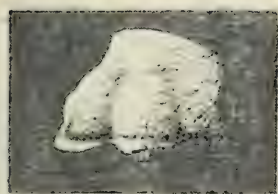
"*O. vermontanus* is narrower than *O. thompsoni*, the axis tapers less, and is relatively wider, being one third as wide as long. The narrowness is confined to the cheeks and length of pleura. The eyes are somewhat shorter; the genal angles are somewhat more advanced and the third segment relatively larger."

The diagnostic features used by the writers, while not in conflict with the above criteria, are more specific. (Fig. 2).

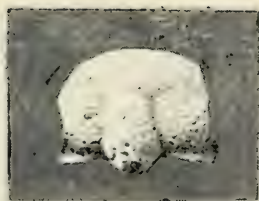
The differences pointed out in Fig. 2 which seem clearly to distinguish these species are not as clear cut in the figures given by Resser and by Walcott, and it might well be that the two species are variations of the same species. This possibility is heightened by the fact that the two species have always been found to occur together.

Olenellus hermani Kindle and Tasch, new species Pl. 1 Fig. 1, 2, 3

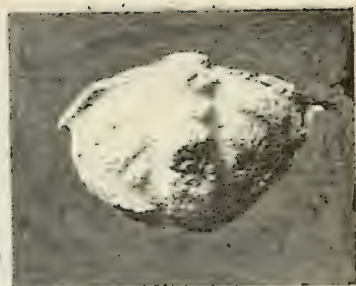
Two cephalo are known, one of which has a well-preserved frontal lobe. The glabellar furrows of this species (referring to the holotype) are more nearly at right angles to the axial line than they are in either *O. thompsoni* or *O. vermontana*. The first glabellar furrow extends laterally to the palebral



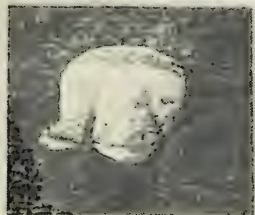
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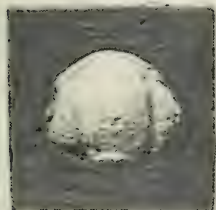
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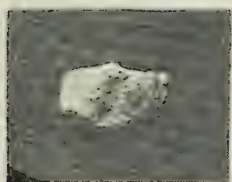
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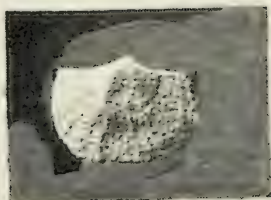
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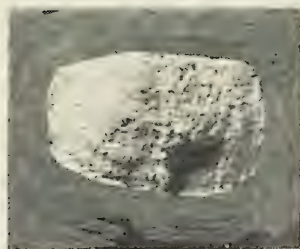
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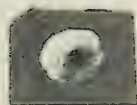
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lobe. The second furrow is shorter than the first. In *O. thompsoni* and *O. vermontanus* the second glabellar furrow does not reach the marginal furrow. In *O. hermani* the second glabellar furrow does not reach the marginal furrow. A prominent spine is located at the posterior of the frontal lobe of the glabella. In the original condition the spine projected backward from the glabella. No reported species of *Olenellus* has a glabellar spine of this type.

Raw (1937, p. 579) observed of the family Olenellidae that,

"In early stages of development the rings behind the frontal lobe are closely comparable with those of the thorax and sometimes even retain vestiges of their axial spines . . . The frontal lobe in this family retains only faint traces of a composition of two segments—by faint lateral furrows, seen in *Elliptocephala asaphoides* . . . Some other trilobites indicate more clearly the presence of two segments in the frontal lobe . . . Some of these strongly suggest that it consists of two segments only, e.g., the unswollen glabellae of Zacanthoidae and Encrinuridae."

Additional evidence of the segmentation of the frontal lobe is afforded by *O. hermani*. The prominent spine projecting backward from the posterior of the frontal lobe of the glabella of *O. hermani* would appear to be a primitive feature relating back to the earlier condition in Arthropoda before the onset of cephalization. In the same way that glabellar rings, in the early stages, may retain vestigial axial spines, the appearance of a frontal lobe spine in *O. hermani* would suggest the coalescence of spine-bearing segments to form the frontal lobe of trilobites of the family Olenellidae. The species name is for George Herman who found the holotype.

Olenellus, sp. undet.

Pl. 2 Fig. 1, 3

These two fragments of cephalon do not afford sufficient criteria for species determination. However, the reentrant angle (Fig. 2) found on *O. vermontanus* cephalon in this collection, which suggests either a degenerate or incipient intergenal spine, actually terminates in a short, pointed barb or spine in the two cephalon considered here.

Resser and Howell ascribed "intergenal

spines" to all species assigned to the genus *Paedeumias*. But several *Olenellus* species likewise show these spines—among others, *O. getzi* Dunbar, *O. wanneri*, and *O. crassimarginatus*. In addition, the glabella of *Paedeumias* is some distance from the anterior marginal rim, and in the absence of a glabella in the specimens at hand, and of the characteristic stalked hypostoma of *Paedeumias*, the two fragments bearing intergenal spines are assigned to *Olenellus*.

Of the three pairs of cheek spines found in the larva of the family Olenellidae, Raw (1937, p. 577) observes that in the adult one pair always persists as genal spines while the retention of a second smaller pair as intergenal spines is only occasional. He considers "the retention by the adult, in some forms of two of these pairs (of cephalic spines)" as a primitive feature distinct from those features which are specialized.

As mentioned above in describing *O. vermontanus*, the possibility exists that those features which are now used to distinguish some species of *Olenellus* may eventually prove to be merely variations of one species.

ANTAGMUS Resser 1936

Antagmus adamsi (Billings)

Pl. 3 Fig. 1, 2

Conocephalites adamsii Billings, Silliman's Am. Jour. Sci., 1848, 2nd series, vol. 5, p. 109.

Conocephalites adamsii Billings, Paleozoic Fossils, 1861, Geol. Survey Canada, vol. 1, p. 12, Fig. 15.

Ptychoparia adamsi (Billings) Matthew (part), Royal Soc. Canada, Trans., 1897, 2nd series, vol. 3, sec. 4, p. 199, pl. 4, Fig. 9.

Ptychoparella adamsi (Billings) Resser, Smithsonian Misc. Coll., 1936, vol. 95, No. 4, p. 14.

Ptychoparella adamsi (Billings) Resser, J. Paleont., 1937, vol. 11, No. 1, Jan. 1937, pl. 8, Fig. 31-33.

Antagmus adamsi (Billings), Lochman, J. Paleont., 1944, vol. 21, No. 1, Jan. 1944, p. 62; 65.

This is a common species in the collection. The area in front of the glabella is convex. The ocular ridge is well developed and the glabella is nearly parallel sided. Three pairs of glabellar furrows show faintly on the weathered specimens. The occipital ring is wide.

Antagmus typicalis Resser

Pl. 3 Fig. 5, 6

Ptychoparia teucer Walcott, U.S. Geological Survey, Bull. 30, p. 197, pl. 26, fig. 3, 1886. — idem, 10th Ann. Rept., p. 652, pl. 96, fig. 3, 1891.

Antagmus teucer (Resser) Smithson. Misc. Coll., vol. 95, No. 4, p. 4, 1936.

Antagmus typicalis Resser, Journal of Paleontology, vol. 11, p. 54, pl. 8, fig. 64, 1937.

This species is the type of the genus *Antagmus*, one of the principal characters being the widening of the front border in the middle line. The species was described as occurring in the Parker or Winooski formation one mile east of Highgate Springs, Vermont. This species is readily distinguished from *A. adamsi* since the border of the latter continues the same downward slope of the brim and in these poorly preserved specimens the furrow between the two is not easy to see. In *A. typicalis*, however, the border turns up sharply, giving this species a distinctive appearance.

BONNIA Walcott 1916

Bonnia swantonensis Resser

Pl. 3 Fig. 3, 4, 7, 8, 9

Protypus senectus Billings, Walcott, Bull. U.S. Geol. Surv. 1886, vol. 30, p. 213, pl. 31 Figs. 2, 2a-c.

Corynexochus capito Walcott, Smithsonian Misc. Coll., 1916, vol. 64, No. 5, p. 315, pl. 57 Figs. 2, 2a-e.

Bonnia swantonensis Resser, Smithsonian Misc. Coll., 1936, vol. 95, No. 4, p. 11.

Bonnia swantonensis Resser, J. Paleont., 1937, vol. 11, No. 1, p. 53, pl. 8 Figs. 59, 62, 63.

Absence of glabellar furrows, a broader glabella and larger and more rugged pygidia distinguish this species from *Bonnia senecta* found in the limestone of Bonne Bay, Newfoundland. Anterior marginal rim of cephalon narrower than that of *Bonnia parvula* found in the limestone of Forteau Bay, Labrador.

Walcott (1916, p. 315) reported the absence of a spine rising from the occipital ring of *Corynexochus capito*. Specimens in this collection indicate an occipital spine is present see fig. 8. However, this feature has little diagnostic value since it occurs in other species of *Bonnia* as well. Similarly, the

marginal spine on the anterior of the pygidia of *Bonnia swantonensis* is not unique to this species and is found in *B. senecta*, in *B. fieldensis*, and in *B. parvula*.

BRACHIOPODA

Kutorgina cingulata (Billings)

Obolella (*Kutorgina*) *cingulata* Billings, (in part) Geol. Surv. Canada, Paleozoic Fossils, 1861, vol. 1, p. 8-9 Fig. 8, 10.

Kutorgina cingulata (Billings) Walcott (in part) Bull. U.S. Geol. Surv., 1886, No. 30, pp. 102-104, pl. 9 Fig. 1, 1a-f.

Kutorgina cingulata (Billings) Walcott, Cambrian Brachiopods, 1912, vol. LI, pt. 1, p. 580, pl. 5 Figs. 1, 1a-s.

Ventral valve shows distinctive mesial sinus.

Nisusia festinata (Billings)

Pl. 3 Fig. 10, 11, 12

Orthisina festinata Billings, Geol. Survey Canada, Paleozoic Fossils, 1861, vol. 1, p. 10, Figs. 11, 12.

Billingsella festinata (Billings), Hall and Clarke, Nat. Hist. New York, Paleontology, 1892, vol. 8, pt. 1.

Nisusia festinata (Billings) Walcott, Proc. U.S. Nat. Mus. 1905, vol. 28, p. 249-251.

Nisusia festinata (Billings) Walcott, Cambrian Brachiopoda, 1912, vol. LI, pt. 1, p. 727, pt. 2, plate C, Figs. 1-1j.

Ventral valve elevated at umbo and apex. "Hinge line straight, usually equal to or greater in length than the width of the body of the shell . . . A shallow or rounded median sinus occurs on most shells." (Walcott, 1912, p. 728).

Paterina cf. *swantonensis* Walcott

Pl. 3 Fig. 15

Paterina Beecher Am. Jour. Sci., 1891, 3rd ser., vol. 41, p. 345.

Paterina Beecher, Hall and Clarke, 1892, idem. p. 249.

Paterina swantonensis, Walcott, Cambrian Brachiopoda, 1912, vol. LI, pt. 1, p. 343-344, pl. 2 Figs. 3-3b.

Walcott noted that *Paterina swantonensis* was exceedingly abundant in the *Olenellus* limestone two miles east of Swanton, Vermont, in association with *Kutorgina cingulata*.

Acrotreta sp. undet.

Pl. 3 Fig. 13, 14

Ventral valve conical with the posterior face more or less flattened.

GASTROPODA, ETC.

Helcionella, sp. undet.

Pl. 3 Fig. 16

Liberty cap shape. Surface features badly weathered.

Hyolithes sp. undet.

Pl. 3 Fig. 17

Straight conical shell. Surface features badly weathered.

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EXPLANATION OF PLATES

All figures are two and one half times natural size.

PLATE 1

- Figure 1, 2, 3—*Olenellus hermani* Kindle and Tasch, new species. 1, 2—the holotype, dorsal and side views. The specimen is from deeply weathered rock. 3—another specimen on solid unweathered rock.
- Figure 4—*Olenellus thompsoni* (Hall).
- Figure 5, 6—*Olenellus vermontanus* (Hall).

PLATE 2

- Figure 1, 3—*Olenellus* sp. undet., cheeks and genal angles. Note the intergenal spine in figure 3.
- Figure 4—*Olenellus thompsoni* (Hall). This cheek and genal angle seem to fit this species.
- Figure 2—Incomplete impression of the long pleural spine characteristic of the third thoracic segment of *Olenellus*.
- Figure 5, 6—Two hypostomas of *Olenellus*. They are mounted upside down so that the anterior end of each is toward the bottom of the page.

PLATE 3

- Figure 1, 2—*Antagmus adamsi* (Billings).
- Figure 5, 6—*Antagmus typicalis* Resser.
- Figure 3, 4, 7, 8, 9—*Bonnina swantonensis* Resser.
- Figure 10, 11, 12—*Nisusia festinata* (Billings), Figure 13, 14—*Acrotreta*.
- Figure 15—*Paterina* cf. *swantonensis*.
- Figure 16—*Helcionella*.
- Figure 17—*Hyolithes*.

Mr. W. H. BRYENTON'S NOTES ON MANITOBA MAMMALS OF THE HERB LAKE — FLIN FLON AREA¹

Compiled by A. L. RAND

National Museum of Canada, Ottawa.

FLIN FLON is a mining town of about 8000 people, 86 miles by rail north and west of The Pas in Manitoba, near the Saskatchewan boundary. Herb Lake on Lake Wekusko lies about 85 miles east of Flin Flon, and is a trapping, fishing and mining centre of about 100 persons; the Lake is reached by road from Mile 81 on the Hudson Bay Railway, and the settlement of Herb Lake by motor boat. There are no roads in the area, and summer travel is by canoe; winter travel by dog team.

This area is in the Precambrian Shield; a country of low relief with elevations ranging approximately from 800 to 1000 feet above sea level. There is much exposed granite; some few sand hills; lakes are common with a maze of waterways. The area is about on the divide between the Churchill river to the north and the Nelson river to the south. Most of the country is covered by low brush and second growth and probably more than half of the area has been burned over within the memory of the present inhabitants; muskegs are common. The commonest trees are spruce and pine; aspen is common locally, and there is white birch about the lakes; grass and sedge swales occur about the waterways.

Mr. W. H. Bryenton, with his brother R. W. Bryenton, trapped out of Herb Lake for about fifteen years (1929-44) and during the summer of 1945 W. H. Bryenton prospected in the Flin Flon area. As a spare time activity in 1945, he studied the mammals of the area, and kept a small line of mouse traps operating all summer. His collecting stations were:

Aimie Lake — about 14 miles northeast of Flin Flon.

Alberts Lake — about 15 miles east of Flin Flon.

Mikanagan Lake — about 10 miles northeast of Flin Flon.

Wabishkok Lake — about 10 miles northeast of Flin Flon.

The season Mr. Bryenton spent in the field was from April to October. Most of the data

are from the 1945 season's field work. Besides personal observations Bryenton interviewed many trappers who supplied him with useful information that is included. Notes of Mr. W. H. Bryenton's trapping days at Herb Lake are also included; and with additional data supplied by R. W. Bryenton of Herb Lake, give data on the size of their catches of furs that is an important part of this report. Dr. J. M. Harrison, of the Geological Survey of Canada who has worked in this area in the three summers 1943-45 has added some notes and provided data on the country generally.

Data on 37 species were secured, and about 80 specimens of 18 species were collected and donated to the National Museum of Canada.

The report that follows speaks for itself of the excellent field work and the careful notes kept by Mr. Bryenton. The well made skins, the careful catalogue, notes and records kept allow conclusions to be drawn as to abundance, breeding season, moult, habitat preference, cyclic changes, as well as the actual occurrence, in a manner that can serve as an example to others who are undertaking similar work. Mr. Bryenton is to be heartily congratulated on the quantity and quality of the work he was able to accomplish while travelling in this area on other business.

The fauna in this area is strictly Canadian zone as a perusal of the list will show, with a slight influence from farther north, shown by the immigration of the caribou.

The many forest fires have undoubtedly had considerable local influence on the mammal populations. The advent of the white trapper has also had its influence; the lynx, marten and fisher are nearly or completely gone. But the country is still considered good trapping grounds, with foxes, coyotes, weasels, muskrat, and more recently red squirrels and beaver forming the bulk of the catches. Under a system of registered trap lines that has been put into effect by the Province of Manitoba, trapping promises to become a more stabilized industry, and this is especially true

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for beaver which are doing well and under a consistent policy should continue to provide an important part of the fur crop.

It is a good "meat" country, moose are common, and in the past two winters barren ground caribou have come south in numbers.

Fluctuations in the mammals are rather pronounced in foxes, weasels, rabbits, and undoubtedly in the smaller mammals though we have not local observations to demonstrate it.

The abundance of small mammals in the Flin Flon area in 1945 is given in Table 1.

Table 1. — Abundance of small mammals in Flin Flon area in 1945:

| Species | Number taken per 100 trap nights |
|--------------------------------|----------------------------------|
| <i>Sorex cinereus</i> | 3.1 |
| <i>Sorex arcticus</i> | 0.06 |
| <i>Sorex palustris</i> | 0.4 |
| <i>Microsorex hoyi</i> | 0.1 |
| <i>Peromyscus maniculatus</i> | 7.5 |
| <i>Synaptomys borealis</i> | 0.06 |
| <i>Phenacomys intermedius</i> | 0.06 |
| <i>Clethrionomys gapperi</i> | 1.7 |
| <i>Microtus pennsylvanicus</i> | 0.8 |
| <i>Zapus hudsonicus</i> | 0.5 |

Sorex cinereus Kerr.

CINEREOUS SHREW. — Common in the Flin Flon area in 1945; specimens were taken on low ground usually near water, in grassy areas, willow, alder, birch, aspen brush, and spruce forest, or in muskeg; often under logs and upturned roots.

The first indications of breeding were a female with embryos on May 20, and a nursing female taken June 10.

Specimens were taken during the daylight hours as well as at night, indicating both diurnal and nocturnal habits. The frequency index was 3.1 per hundred trap nights.

Specimens (many in alcohol) were taken as follows: Alberts Lake, 18; Aimie Lake, 2; Mikanagan Lake, 1; Wabishkok Lake, 14.

Measurements are as follows: total length, (10) 85-95 mm. (av. 89.1); tail (10) 33-38 (av. 34.9); hind foot (10) 11-13 (av. 11.9).

Sorex arcticus Kerr.

SADDLE BACKED SHREW. — Rare in the Flin Flon area in 1945; but a single specimen, a female with no embryos, taken at Alberts Lake on June 7, 1945. The habitat was muskeg around a small lake.

The frequency index was .06 per 100 trap nights.

The specimen measured, total length 110.5 mm.; tail, 36; hind foot, 13.5.

Sorex palustris palustris Richardson.

WATER SHREW. — Uncommon in the Flin Flon area in 1945; specimens were taken along lake shores, in grassy places, some of them very swampy. One specimen was taken during daylight hours, indicating they are sometimes abroad at such hours. On several occasions the bait used was cheese.

There is a tendency for these animals to go in pairs. Six specimens were taken, and only two of these were taken singly; two were taken on August 11, and on August 17 and 18 two were taken in the same trap.

The frequency index was 0.4 per 100 trap nights.

Specimens were taken as follows; Aimie Lake 1; Wabishkok Lake, 5.

In previous years while trapping near Herb Lake, W. H. Bryenton has found this species living in and about muskrat houses. It was occasionally taken in muskrat and mink sets.

Microsorex hoyi intervectus Jackson.

PIGMY SHREW. — Rare in the Flin Flon area in 1945; specimens were taken among grass and windfalls in an alder and pine area on a lake shore; and in a spruce, alder and willow area.

The frequency index was .1 per 100 trap nights.

Two specimens were taken as follows: Alberts Lake, 1; Aimie Lake, 1.

Measurements are: total length, 71.5, 78 mm.; tail, 26, 27; hind foot, 9.5, 9.5; skull, condylobasal length, 13.7, 14.5; cranial breadth, 6.5, 6.7 mm.

Myotis lucifugus (Le Conte).

LITTLE BROWN BAT. — Apparently very scarce in both Flin Flon and Herb Lake areas; none seen in 1945, and of the many residents questioned, only two reported having seen bats. One of these, Mr. A. Clemens, told of finding two in an old camp in late fall.

These records are tentatively referred to *M. lucifugus*, as this species is represented in the Manitoba Museum collection from near The Pas, and the details are not incompatible with this identification.

Mr. R. W. Bryenton notes that although bats are not plentiful at Herb Lake, they have been seen on many occasions, and Dr. Harrison saw one just west of Herb Lake in the summer of 1945.

Ursus americanus Pallas.

BLACK BEAR. — Common in the Flin Flon area; though bear sign was common, bears were seldom actually seen. They are regarded with disfavor, and when seen are shot or shot at, sufficient reason for their wariness. Tracks were seen in the snow on April 22 shortly after the party arrived in the country, and signs were commonly seen until October 7, about the time the party left. More than eight bears were killed in the general area during the summer, but Bryenton actually saw but two other bears all summer. All were in the black phase, but the brown phase is said to be fairly common, and the same is true at Herb Lake.

Oscar Johnson, registered trapper at Aimie Lake, gave Bryenton the skull of a large black bear which in his absence had torn off part of the roof of his camp, torn up the flour, chewed up two water pails, the coffee pot, and finally ripped to pieces a gallon can of paint, spilling it all over the camp. When Johnson returned he repaired the roof, and that night, about 2 a.m. he was awakened by the bear on the roof, and shot it. Later in the summer one tore up a trapper's fish net and another tore up a tent of some miners.

Such incidents as there, and damages to canoes, are common enough here, and at Herb Lake, to justify the prejudice against black bears, and the practice of shooting them on sight. In regard to canoe damage, at Herb Lake, it seems that if a canoe is laid on the ground, bottom up, the bear may break in apparently to see what is in it. But if it is cocked up so the bear can walk underneath, it will not injure it.

About Sept. 1, 1945, Roy Grey of Herb Lake had a dog accompanying him attempt to chase a party of four black bears (probably a female and cubs). The old bear soon began to chase the dog that ran back to its master. Grey tried to climb a tree, but the old bear, her anger transferred to the man, badly clawed and bit his legs, despite the high boots he wore, so that he spent several weeks in the Flin Flon Hospital.

Two local trappers, Angus Boaz and Tom Wykstrandt, said they had definite knowledge of three bears hibernating in one den, an old female, a partly grown bear, and a small young one. R. W. Bryenton, at Herb Lake, found two bears in one den, a female and a young of the previous season. The den was located in an overhanging bank on an island surrounded by floating bog.

Two dens of bears found at Herb Lake were under roots of upturned trees, and one other was dug into a bank overhanging a small pond.

In this area, in spring, bears frequent rapids in creeks and rivers to fish. In the fall, of course, they turn to berries as indicated by the remains of berries in their droppings, and the great many bear tracks in the snow in berry patches in September.

Though normally shy, occasionally one may be aggressive, perhaps in the rutting season, as the following incident indicates from W. H. Bryenton's diary: "July 10, 1945, a bear stood in the water in a swamp and snorted at me less than 100 feet away. It followed me, breaking limbs, and making a snorting noise; I hurried to the canoe as fast as I could. . . . I have heard bears make this noise in traps, but never in the wild."

Oscar Johnson told of a friend killing a large black bear which was reluctant to come out of the water when he approached it. After shooting the bear he would not skin it as the nose, ears and belly were loaded with ticks.

Johnson was doubtful about this until he went and examined the bear and found it as described.

Specimens (skulls only) were collected as follows: Alberts Lake, 3; Mikanagan Lake, 1.

Three females measured, total length, 1352, 1368, 1464 mm.; tail, 120, 131, 105; hind foot, 180, 200, 225; ear from notch, 115 mm.; the cub of the third (largest) bear taken June 7 measured: total length, 650 mm.; tail, 40; hind foot, 120; ear from notch, 85 mm.

Martes americana (Turton).

MARTEN. — Many trappers were interviewed, in the Flin Flon area, and none knew of marten being taken in this area in the last twenty years; in the Herb Lake country they have been taken recently as follows:—two in 1929-30; one in 1930-31, and one in 1931-32; one other was taken in the spring of 1934 or 1935. None have been taken in late years, though several years ago tracks of a stray marten were seen.

Martes pennanti (Erxleben).

FISHER. — Evidently about exterminated in the whole area, with but the following records of its occurrence: one taken at Reed Lake by J. Charterand in the winter of 1931-32, and one taken on Grassy Ridge east of Herb Lake by R. Nickelson about 1937.

Mustela erminea Linnaeus.

SHORT-TAILED WEASEL. — For the last three years in the Flin Flon area weasels have been exceptionally scarce, but seem to be increasing according to local trappers; about half a dozen were seen during the summer. Oscar Johnson said that in 1943-44, when weasels were very scarce, all taken were females; in 1944-45 when they were more plentiful, there were few females. Here, as elsewhere, weasels are often very bold about tents, and it was possible to amuse ourselves with an occasional weasel by tying a piece of ham to a string and have the weasel try to carry off the ham.

On April 30, 1945, a weasel was seen that was all brown but for part of its tail; the last one seen during the season was on September 29. It was a large male, and while still brown, was lighter colored than the glossy brown of summer.

At Herb Lake the last four winters, weasels have been scarce. In the winter of 1943-44 all we took (two to three hundred) were females;

1914-45 about 180 weasels were taken and in 1945-46, 240 skins (R.W.B.). The largest catch we had was in 1937 when we caught 700 by Christmas time when I quit.

One specimen was taken at Alberts Lake. It was a male and measured, total length, 320 mm.; tail, 93; hind foot, 42; its skull measured, basal length 44; zygomatic breadth, 23.

Mustela rixosa (Bangs).

LEAST WEASEL. — Rare; in the Flin Flon area some trappers knew it, others did not.

In the Herb Lake area, R. W. Bryenton notes: "I believe the least weasel is more common than generally suspected but owing to its diminutive size is seldom taken. Since first taking notice of the difference, I find I catch about one in every hundred weasel taken."

Mustela vison Schreber.

MINK. — Scarce in the Flin Flon area where no mink signs were seen all summer, and two or three skins seemed to be the ordinary catch around here during the past season (1944-45), though this appears to be ideal mink country.

In the Herb Lake area one winter we took between 40 and 50 mink. Our catch would probably average around 15 or 20 pelts annually up till 1940. Since then, the annual catch was probably around 10.

In parts of the country where small creeks and rapids were numerous, other trappers' catches may have been slightly larger. Old beaver houses are a favourite mink habitat. Skins usually are prime about Nov. 1-10; during March they become singed or springy.

Paddling along a creek we once surprised a mink which ran up a tree, sat on a branch and watched us pass. On another occasion I caught a mink in a squirrel trap inside one of my line camps.

R. W. Bryenton adds the note that 1931 and 1945 were low years of mink numbers, and there was some increase in 1946.

Lutra canadensis (Schreber).

OTTER. — Very scarce in the Flin Flon area; signs were seen in several places during the summer, and at least one otter was taken in this area the preceeding winter (1944-45). On one small lake I found an otter den in an old beaver house, and otter signs were

plentiful on the lake shore. One skull was taken from an old carcass, from Aimie Lake.

Otter are scarce at Herb Lake. In 1929-30 (this winter I trapped alone) I caught 6 and we have taken one or two every winter since.

Most trappers think that otter kill beaver and muskrat. I have never seen any proof of this theory. I once knew a pair of otters to live near or in a beaver house occupied by beaver all winter. I caught one of these otters in a beaver trap set on the bottom about 6 ft. from the house and under four feet of water. I shot the other otter. The beaver did not appear to have been molested as I caught four and am sure others were left.

Old beaver houses and runs seem to be favourite habitat. In winter otter usually live near rapids. They become prime about Nov. 1 to 15 and singed in March.

However, R. W. Bryenton considers that otter are quite common at Herb Lake and writes the average catch per trapper is about 4 per season.

In regard to beaver versus otter he writes: "In the winter of 1945-46 I found where otter lived in a beaver house with beavers. The otter had tunnels where it came out to sun. After open water I caught two kit beaver and saw other beaver at this house. In this case at least the otter did not kill the beaver. It seems the common belief here that they kill beaver but I have no proof of this to date."

Gulo luscus (Linnaeus).

WOLVERINE. — Though wolverines undoubtedly used to occur in the Flin Flon area, none of the trappers interviewed knew of one being taken south of the Churchill River.

At Herb Lake, one lived at one of our meat caches for a time in the winter 1932-33 but when traps were set the wolverine decided it was time to move on.

Mephitis mephitis (Schreber).

SKUNK. — Very scarce; in the Flin Flon area Oscar Johnson said he had caught only two skunks in the past ten years; no sign of them was seen during the summer.

It was never very plentiful at Herb Lake but some years was more plentiful than others.

I think R. W. Bryenton took about 10 or 12 one year, though the usual catch is two

or three. Traps are never set for them and many trappers throw them away rather than skin them.

R. W. Bryenton writes that the peak of the cycle for skunk was in 1938 and the low point was in 1945.

Vulpes fulva (Desmarest).

RED FOX. — Probably cyclic in abundance in the Flin Flon area; local trappers said they were scarce in the trapping season of 1944-45, but they seem to be increasing. Tracks, and droppings were seen during the summer, and small catches were expected the coming winter (1945-46).

In the Herb Lake district foxes were definitely cyclic varying in abundance with the rabbits. The length of the cycle was about 9 years. Peak of cycles were — (1924-25)-(1933-34) (1941-42). Shortly after the decline in 1935 an abundance of mice seemed to bolster the fox run and no doubt accounted for the exceptional abundance in 1941 to 1943. (These mice were probably meadow mice (*Microtus pennsylvanicus*). The country was overrun with them, hills covered with caribou moss were dug up as if scratched up by chickens.)

Foxes from this district are not as heavily furred as those from farther north. They prime about Oct. 20 to Nov. 1 and are usually rubbed by Jan. 1, sometimes earlier.

Foxes locally known as "Samson foxes" are some years quite common. These have no guard hairs and are woolly like a sheep. This condition occurs also in cross and silver variations. They are seldom skinned by trappers. The proportion of color phases is: red seem to be about 75%, cross 20% and silver 5%.

Some years heavily furred foxes which are not rubbed appear late in the winter no doubt migrating from the north and east.

During the berry season the foxes live almost entirely on blueberries and cranberries, this being noted by the droppings. In the late fall of 1943 when feed was very scarce, I saw droppings which contained wing covers of beetles and one stomach opened contained the feet of another fox. At this time some foxes were extremely thin the lungs showing clearly through the skinned carcass. This was rather surprising as berries were plentiful earlier in the fall.

In this district foxes are mostly taken in snares but a few are still being trapped.

In the winter of 1941-42 two of us took approximately 600 foxes, this being by far the largest catch I have heard of from this country. In the peak winter 33-34 we took approximately 300. The average catch per trapper in the between peak years might be around 20 foxes. The poor price of fox furs in the past few years has caused many trappers to neglect the fox.

Many dens were found, the females digging them out in the fall and visiting them at intervals during the winter. In one instance I know of a female cross fox being taken in a lynx snare in late March and containing ten embryos.

Canis latrans Say.

COYOTE. — Very scarce in the Flin Flon area during the summer of 1945; not one was seen nor heard, though a few signs were seen that were probably those of coyotes. Tom Wykstrandt said that last winter there were quite a few coyotes.

In the Herb Lake area, in previous years, coyotes were sometimes quite common. They are usually taken in snares.

The coyotes from Herb Lake seemed to me to be larger than the prairie coyotes and we called them brush wolves. They increased in abundance with the foxes. I believe our largest catch was in winter 1940 and 41 when we took around 40, the average catch being possibly six to ten. They do not rub as early as the fox and are prime about the same time or slightly earlier. There were coyotes in the Herb Lake area when I first trapped there 1929-30 and I believe this type is native rather than migrant from prairies.

Canis lupus Linnaeus.

WOLF. — In the Flin Flon area no wolves were seen nor heard during the summer of 1945, but they are said to be fairly common here in the winter. It is possible they go farther north to den.

The same is true in the Herb Lake country, where I have never seen nor heard wolves in summer but small bands are common during winter.

One winter at Herb Lake I had an encounter with wolves that nearly provided material for a tale of an attack by wolves. Travelling across a lake, I saw a small band of 10 wolves, 9 black, 1 grey, apparently playing. They were a mile or more away. Suddenly they all started toward me at top speed. I had

but a 22 calibre rifle, and began to be worried. I began to fire at them, but the noise of the shots was lost in the wind and the wolves came to within a few hundred yards. Suddenly they turned again, and retreated as fast as they had come, much to my relief. However, I have never heard of an attack on a human.

I have often found moose and caribou and occasionally deer killed by wolves. On one occasion I killed a young moose which the wolves had ham-strung leaving it still living. Its nose was chewed off and the meat inside the hide of the hind quarters was chewed so it was in lumps. I did not scare the wolves away and am of the opinion that they intended to return and have a feed of unfrozen meat.

Wolves are a nuisance to the trappers tearing up meat caches, and occasionally a fox when found alive in a trap. They are hard to trap and snare.

Catches are small; due to the wily nature of the animals they are seldom shot. The value of the fur is small and there is little encouragement for the trapper to bother with them. The grey phase is probably more common than the black in this area.

Lynx canadensis Kerr.

LYNX. — In the Flin Flon area the lynx seems to have been completely extirpated; no lynx tracks were reported for the preceding winter (1944-45) and Oscar Johnson said the last lynx he had taken was three years ago.

Tom Wykstrandt said that some years ago he took a female lynx that was carrying six embryos.

Lynx were probably cyclic in the Herb Lake district until the trappers became more plentiful than the lynx. Old timers tell of large runs of these animals and in the winter of 1933-34 they became quite abundant. Two of us took around 70 during that winter; the following winter we caught about 10 and since have probably taken half a dozen. The last taken was in 1942.

R. W. Bryenton adds the following: Lynx still occur in this district though not in any quantity, perhaps four or five pelts being taken each year in the district.

Marmota monax Linnaeus.

WOODCHUCK. — Very scarce in the Flin Flon area where two or three were seen in six months' prospecting in 1945.

In the Herb Lake area, woodchucks are more plentiful some years than others. One summer (1934 I believe) they were exceptionally abundant and caused much damage to the gardens of the district. They den on south slopes of hills and in cracks in the rocks around the lake shores. There is no market for the hides but they are occasionally used for trimming parkas, moccasins, mitts, etc.

Eutamias minimus hudsonius Anderson and Rand.

LITTLE CHIPMUNK. — In the Flin Flon area they are plentiful everywhere. Undoubtedly increasing with the absence of hawks, owls and weasels. One noted on October 7 running about camp was very fat and well furred; it was chewing up a fish line for a nest.

Breeding data were as follows: a female with six large embryos (3 right, 3 left horn of uterus) was taken on May 17; another with six large embryos (4 right, 2 left) was taken June 7; on June 18 a nursing female was taken, and on July 24 three apparently full grown young were seen playing on a rock.

Many chipmunks were taken in mouse traps, and the frequency index was 1.8 per hundred traps.

Specimens were taken as follows: Alberts Lake, 4. These compare well with Herchmer and Thicket Portage specimens.

In the Herb Lake country chipmunks are abundant everywhere, except in heavy forest and muskeg country. Dr. Harrison adds that he has found them especially common on sandy ridges in 1943-45.

Tamiasciurus hudsonicus Erxleben.

RED SQUIRREL. — In the Flin Flon area, abundant; like the chipmunk it has increased with the absence of carnivorous birds and mammals. Few trappers take them; they do not seem to realize the aggregate value of a winter's squirrel catch, and some say they do not bother with them because they have too many fleas.

On May 28 a nest about 10 feet up in a spruce tree was found to contain three young squirrels about the size of jumping mice.

Squirrels have been increasing in the Herb Lake area since 1942 in spite of trapping.

They build nests in the trees where the young are likely born. In the trappers line

camp the squirrel takes the hay from the bunk and the moss from the cracks, some moose hair and old rags and makes a nest in the bunk, another under it, another on the table, and another in the corner over the stove. Nearly every trapper at some time makes the mistake of using these nests as a mattress in his bunk. He spends the night scratching as they are full of fleas.

Squirrels store spruce and pine cones under rocks, at tree roots and in burrows. Toadstools and other fungi are hung in forks of bushes and on limbs of spruce too dry. Dr. Harrison adds that he found them common throughout, especially on sandy ridges, and one day he had at least 12 in his camp at Snow Lake in 1945, where they caused annoyance by getting into foodstuffs.

R. W. Bryenton supplied sizes of individual large catches as 1944-45, 1800 pelts; 1945-46, 940 skins.

Glaucomys sabrinus Shaw.

FLYING SQUIRREL. — Reported to be quite common, Flin Flon, 1945, but none seen.

At Herb Lake they are common in large spruce forests. Many are taken by the trappers and are thrown away. They are fond of frozen meat and fish and are very bold at night but never seen during daylight.

R. W. Bryenton writes that in the trapping season of 1945-46 he took between one and two hundred of these animals in traps set for furbearers. No use can be made of them.

Castor canadensis Kuhl.

BEAVER. — In the Flin Flon area beaver are quite plentiful; many houses were seen, as well as some beaver; everyone interviewed reports them on the increase. One trapper reports about nine beaver houses on his trap line.

In the Herb Lake area, R. W. Bryenton writes, beaver have increased greatly since registration of trap lines, and trappers take an average of one beaver per house or beaver lodge.

I know of two cases of females having 7 embryos, quite a few cases of 6, but I believe the average to be 3 or 4; R. W. Bryenton adds that the young females have an average of 3 or 4 young, old females up to 8 young, and 6 is very common. He also writes that females whose mates have been trapped one year are found to be barren the following year.

Hides are stretched oval and bought according to measurements; the total of the length from eye to tail plus the width at the centre gives a number that is compared with the following scale: XX large, over 65 inches; EX large, 60-65 inches; Large, 55-60 inches; Medium, 50-66 inches; Small, 45-50 inches; Kit, under 45 inches.

Peromyscus maniculatus Wagner.

WHITE-FOOTED MOUSE. — In the Flin Flon area it was the most plentiful of mice, common on all dry ground, and a nuisance around camp. It is apparently increasing. The frequency index was 7.5 per hundred trap nights.

Data on reproduction were as follows: May 6-18, no pregnant females; the first pregnant female was taken on May 19, a female carrying four embryos; on May 21 the first nursing female was taken; on June 21 another pregnant female, with seven large embryos was taken; on July 15 the first young animals of the year were trapped.

Specimens were taken as follows: Alberts Lake, 2; Aimie Lake, 1; Wabishkok Lake, 1.

It is common in the Herb Lake area most years but some years noticeably absent. It is the most destructive mouse in the trapper's camp and it is hard to make a cache that it cannot get at. It is very bold and keeps the trapper awake at night rattling out code messages with its tail on loose can lids or on the paper overhead.

Synaptomys borealis smithi Anderson and Rand.

NORTHERN BOG LEMMING. — Very rare in the Flin Flon area, where but a single specimen was taken on a spruce island in Alberts Lake on May 15. This gives a frequency index of about 0.03 per 100 trap nights.

The specimen compares well with our other Manitoba material of *smithi*, supporting its distinctiveness.

Phenacomys intermedius Merriam.

PHENACOMYS. — Rare; one specimen only was taken at Wabishkok Lake in a line of traps set under piles of posts and windfalls. The frequency index was .06 per 100 trap nights.

The specimen was preserved in formalin, and the skull has been removed and cleaned and the skin made up. The subspecies *P.i. mackenzii* is recorded from Churchill; the race *P.i. soperi* from farther south in Mani-

toba (Anderson). The present specimen (out of formalin) is much darker and richer brown than *mackenzii* from northern Alberta; and lacks the markedly depressed rostrum of that race; *soperi* is a pale form, paler than *mackenzii*; the present specimen compares well with skull characters of *ungava* from Ontario but is much darker and browner. I hesitate to assign it to any subspecies. (A.L.R.)

Clethrionomys gapperi athabascaae Preble.

RED-BACKED MOUSE. — Scarce in the Flin Flon area; the frequency index was about 1.7 per hundred trap nights. Data on reproduction were as follows: females with five embryos each were taken on June 20, June 21, August 1, September 1; on July 6 one with 4 embryos was taken; on September 4 a nursing female with 5 placental scars. Young of the year were taken only in September when 3 adults, and 5 young about three-quarters grown, were taken.

Specimens were saved as follows: Alberts Lake, 6. These compare well in color with specimens from northern Alberta. One out of 27 individuals trapped is in the brown-backed pelage, giving a frequency of about 3.7%. (A.L.R.)

Microtus pennsylvanicus drummondi Audubon and Bachman.

DRUMMOND MEADOW MOUSE. — Very scarce in the Flin Flon area in 1945, and taken at only one camp at Alberts Lake, despite extensive trapping elsewhere. Most of them were taken in the grassy margin of the lake shore. The frequency index was about 0.8 per 100 trap nights. Data on reproduction are as follows: May 26, female with 5 embryos; June 14, female with 6 embryos.

Six specimens were saved from Alberts Lake; the largest measured, total length, 155 mm.; tail, 37; hind foot, 19.

I believe this is the mouse that some years becomes very abundant at Herb Lake in damp places and causes much damage to fur in traps as well as eating up baits as fast as they are put in pens. Some years it is nearly impossible to trap weasels as they are eaten as fast as they are caught.

Ondatra zibethica (Linnaeus).

MUSKRAT. — Scarce in the Flin Flon area; though many fine muskrat swamps were passed through, but few muskrats were seen, and nowhere were they plentiful. Of ten

carcasses of females (from trappers) examined between May 14 and May 27, only one was pregnant. One skull was sent to the museum.

R. W. Bryenton, sent the museum, in the spring of 1945, a muskrat skull from the Herb Lake area that had pronounced malocclusion. The upper incisors had spread and passed the lower incisors, one on each side, and curved around to make a three-quarters circle.

While the muskrats become very plentiful in certain years, there does not seem to be any definite cycle. High water levels no doubt influence the abundance but not necessarily as I remember high water years when rats were very scarce and in 1940 when water levels were very low the rats increased surprisingly. However, when water levels are high, rats live in every little swamp. Winter often catches them without deep enough water so when their pond freezes to the bottom the rat is forced out. It usually perishes or is caught by foxes or owls. After freeze up, in the fall of 1933, the muskegs were full of rat trails and the foxes lived on rats. Some rats reached larger lakes and burrowed into other rat houses; the rest soon froze their tail and legs and perished.

There is a distinct difference between the rats taken from muskeg lakes and those taken from the lakes where feed is plentiful. In the first case, they are small, light-colored, greyish fur, black colored teeth and the tail is small and nearly round. Where the feed is abundant, they are almost twice the size, with brown fur, heavy pelts, yellow teeth, and the tail is much deeper than it is wide. I believe the difference is due entirely to food conditions, but may have something to do with the acidity of the water. In this district the rats live in runs in the banks making houses in the better feeding spots and in the winter making feeders on the ice. In lakes where feed is scarce, strings of these feeders may be seen extending from the shores right to the middle of the lake. Many trappers claim that the northern pike (Jack fish) kills many young rats and this may easily be true. I have often found mice in pike stomachs. Hawks and owls and probably mink are also enemies.

Our peak catch was in the spring of 1934 when we took 1700. The following spring we caught 125 on the same ground and they had not been trapped close the spring before.

R. W. Bryenton supplies the following: In good years rats caught contained up to 13 embryos; in poor years many females caught and examined contained no embryos.

Zapus hudsonicus Zimmerman.

JUMPING MOUSE. — Scarce; specimens were taken in muskeg and in grass around a small lake; in aspen and alder shrubbery; and in a very wet grass and willow area along a small creek.

The frequency index was .5 per 100 trap nights.

Eight specimens were taken as follows: Alberts Lake, 5; Aimie Lake, 2; Wabishkok Lake, 1.

Erethizon dorsatum dorsatum Linnaeus.

EASTERN PORCUPINE. — Scarce in the Flin Flon area, where about six were seen during the six months in the field.

Near Aimie Lake on July 10, a porcupine was seen swimming across a river. It swam high in the water, and at a distance was first mistaken for a beaver. It was in very poor pelage, with the back nearly bare of hair and quills.

In the Herb Lake area they are still scarcer, and in about ten years trapping there only about a half dozen were seen.

One specimen was taken, a female at Alberts Lake, May 15, 1945. It measured, total length, 927 mm.; hind foot, 101. The skull is typical of that of the eastern race; however in pelage it shows an approach toward the western forms. The pelage is long and dense, with plentiful guard hairs, and the guard hairs are extensively tipped with yellowish white. (A.L.R.)

R. W. Bryenton supplies the following from Herb Lake: Porcupine, though very scarce here in the early 1930's reached a peak in 1945, when I would see one in almost any day's travel. On two occasions I found young in early May; two young were seen once, one only the second time.

Lepus americanus Erxleben.

VARYING HARE or SNOWSHOE RABBIT. — In the Flin Flon area common but not abundant and apparently increasing very fast in 1945.

In May rabbits still retained much of their white winter pelage, and of three seen on May 23 two still had considerable white hair on the back.

The first young of the season, a very small one, was seen on June 7. In August young were plentiful and seen daily, including one very small one that was stepped on and killed on August 23.

In the Herb Lake area, cycles of abundance were as follows:

Peak years 1933-34 and 1942-43;

Low years 1934-35 and 1943-44.

Rabbits are fond of frozen fish and meat and so are often caught in weasel and mink traps; in fact it is a problem to keep them out. When frozen they are often eaten by other rabbits. Weasels and squirrels are also often eaten by rabbits — strange as it may seem.

Dr. Harrison adds that in 1945 rabbits were increasing in the Herb Lake area.

Odocoileus virginianus Boddaert.

WHITE-TAILED DEER. — Scarce in the Flin Flon area; during the summer three were seen and a few fresh tracks.

One skull and one tail were sent to the museum from Wabishkok Lake, August 2.

Deer have been scarce in the Herb Lake district ever since I went there (1929). I believe that year by year they have become scarcer. Twice I surprised a lone wolf eating on a fresh kill. In both cases the deer had been chased out on the ice of the lake and killed. The two places were less than a mile apart but the occasions were in different winters.

In 1929 I shot a female with horns. They were about a foot long with a single fork.

Two species of deer may be confused here. (A.L.R.)

Odocoileus hemionus Rafinesque.

MULE DEER. — R. W. Bryenton supplies the information that there are two kind of deer in the Herb Lake area, distinguished by the tail; one has a long, white tail (the Virginia or white tailed deer) and the other has a short tail (with a black tip, the mule deer).

Dr. Harrison says that in his three summers in this area he has never seen a deer of either species.

Alces americana Clinton.

MOOSE. — In the Flin Flon area moose were fairly common; about eight were seen during the summer and signs were common, but none was heard in the calling season, even in good moose country.

Evidently there has been considerable mortality from causes other than predation and

hunting. Oscar Johnson said that last spring, just before the break up he found two carcasses of bull moose, apparently killed by ticks. The carcasses were still covered with living ticks.

In one locality an area of about one square mile was found where 5 moose had died in recent years. They had apparently died in the spring. The bones were not scattered much, so it is unlikely that they were killed by wolves. Nowhere else were such remains seen.

Moose were fairly common at Herb Lake, and there was not much variation from year to year. I once found a carcass of a young moose which had died in the spring apparently from ticks. Twin calves are common. The rut starts about Sept. 15 and lasts for about two weeks.

Wolves kill many young during the winter.

R. W. Bryenton supplies the following: At Herb Lake the moose are quite plentiful most years, sometimes appearing scarce at one season but returning with the change of season. I believe they shift from one feed ground to another, sometimes many miles apart. Though quite scarce in the fall of the year near Herb Lake settlement, there seems to be an increase about December. I believe this is due to a change of diet as they apparently live on birch at this season.

Twin calves are the rule rather than the exception and I have seen triplets.

Rangifer arcticus Richardson.

BARREN-GROUND CARIBOU. — On the Burnt Wood River, west of Nelson House, Tom Wyksrandt reported that the preceding winter (1944-45) caribou came south about Christmas over his trap line by the thousands, leaving the snow on the lakes all trampled, and spoiling many of his sets for fur bearers. He said that the Nelson House Indians killed hundreds of caribou. In his 25 years of trapping he had never seen the caribou so plentiful. In the eastern part of Herb Lake area R. W. Bryenton reports that the caribou appeared in numbers after New Years, probably the same migration. These animals returned north in the spring. The few caribou seen in the country during the summer of 1945 are presumably woodland caribou, and are discussed under the next heading.

Caribou moss (lichen) was scarce in the Flin Flon area in 1945.

While barren-ground caribou have come into this district in the past two winters, no large

migrations had been noted previously though their presence in small numbers was suspected.

R. W. Bryenton supplies the following: barren land caribou appeared in great numbers at Herb Lake in January, 1945, and in November, 1945.

Rangifer caribou Gmelin.

WOODLAND CARIBOU. — Apparently fairly common in the Flin Flon area; several were seen during the summer, and in some localities there were well beaten trails.

The finding of caribou on islands in lakes, as the following incidents show, may have some significance: On June 21 I surprised a cow caribou and calf swimming from an island to the shore, and paddled along beside them for about a quarter of a mile. The calf kept bleating to its mother, but she reached the shore first, and ran off and left the calf. On

July 17 two female caribou were seen on an island in another lake.

Herb Lake data: Common in large muskeg districts usually in small bands. They do not travel on the lakes as much as the barren-ground caribou. They are considerably larger and darker in color.

R. W. Bryenton contributed the following: Horns of barren land caribou are round and slim sweeping back in a curve. Those of the woodland are heavier and flatter, more erect and with more branches. Woodland caribou are heavier, though there are some very large animals in the barren land bands. Woodland caribou were plentiful in the early 1930's but dwindled off in the early 1940's.

Dr. Harrison reports he considers them common in the Herb Lake area; he saw 3 singles in one day in July, 3 in a group in September, and occasional lone animals during the summer.

SCHNEIDER'S THREE NEW CANADIAN WILLOW SPECIES¹

(*Salix anamesa*, *S. fullertonensis*, and *S. hudsonensis*).

CARLETON R. BALL,

Washington, D.C.

IN OCTOBER, 1918, Dr. Camillo Schneider published two new species and one hybrid of American willows from the Hudson Bay area of Canada. These were *Salix anamesa*, *S. fullertonensis*, and *S. fullertonensis* X *S. groenlandica* (= *S. arctophila* Ckll.). In January, 1919, he republished the hybrid as a third new species, *S. hudsonensis*.

At our entry into World War I, Dr. Schneider was visiting the United States. He was interned as a German national but permitted to accept employment at the Arnold Arboretum. Being a dendrologist, he was set to monographing the American willows. Naturally, he was worried about his own situation and also about that of his family, in Germany without financial support. He had little personal knowledge of American *Salices* and almost no opportunity for travel and observation. He also was working under pressure for speed in publication. The best work is not done under such circumstances.

Finally, like many others, he had certain obsessions in taxonomic matters. One was that the presence or absence of stomas in the epidermis of the upper surface of the leaf

was a genetic character of high value for taxonomic purposes. He clung to this belief in spite of finding scarcely a species which was wholly consistent in this regard. Unlike many taxonomists, however, he recorded his doubts and uncertainties, although these seldom deterred him from taxonomic action.

In the light of this background, let us examine his three new Canadian species. With the third, we must consider, also, his previous treatment of an older species (*S. anglorum* Cham.), which treatment was basic to his conclusion.

1. *Salix anamesa* Schneider, "spec. nova".

Salix anamesa was published in 1918 (Bot. Gaz. 66:348-353, Oct., 1918) as a member of Section *Glaucæ*. After a 46-line description, Schneider cites 14 specimens and then adds 2.5 pages of discussion of his uncertainties. Of the 14 specimens cited, he expressed doubts of the actual relationships of nine. This would seem to indicate extreme uncertainty as to the validity of his species, which he compares with *S. cordifolia* Pursh and *S. glauca* L. (American forms) of the Section *Glaucæ* and with *S. anglorum* of the Section *Ovalifoliae*. His discussion begins:—

¹) Received for publication June 6, 1947.

"As already said, this species is certainly most closely related to *S. cordifolia*, from which it chiefly differs by the presence of stomata in the upper leaf surface. I should have treated it as a variety of this species were it not for the fact that there are a number of quasi intermediate forms between it and *S. anglorum*." (p. 350).

In other words, if there were stomas in the upper leaf surface it was *S. anamesa* and if there were no stomas it was *S. cordifolia*, even if the specimens were complete—indistinguishable by other characters. As to *S. anglorum*, Schneider already had discussed it at great length in August, 1918, including three new varieties, but had failed to visualize the species itself, as will be shown in discussion of his third species.

Dr. Fernald, in 1926, monographed the widely distributed and normally variable *S. cordifolia* and six varieties, including four new (*Rhodora* 28:181-188) and concluded that *S. anamesa* Schn. was not separable from his *S. cordifolia* var. *intonsa*. Fernald referred to Schneider's recorded doubts of the true affinities of numerous specimens he had assigned to his *S. anamesa*, and concludes: "Until its own author can recognize *S. anamesa*, its claims for specific rank are not likely to appeal to others". (p. 186).

2. *S. fullertonensis* Schneider, "nov. spec."

Salix fullertonensis was published in October, 1918 (*Bot. Gaz.* 66:340-342), along with *S. anamesa*, as a member of Section *Glaucæ*. The description shows it to be related to *S. brachycarpa* Nutt. but differing markedly in the normally trailing branchlets and the much more elongated ament-bearing leafy peduncles, reaching lengths of 1-2 or sometimes 3 cm. The leaves also are duller and sometimes denticulate. An examination of most of the specimens cited, and of several others, from the west side of Hudson Bay, shows it to be a valid species of the Section *Glaucæ*. In its trailing habit, however, it simulates most members of the Section *Ovalifoliae* (*Arcticæ*), to which *S. anglorum* and *S. arctica* belong.

3. *Salix hudsonensis* Schneider, "spec. nov."

Schneider, in his second paper, discussing species related to *S. glauca*, described his *S. anamesa* and *S. fullertonensis* and immediately followed the latter with the description of a supposed hybrid, *S. fullertonensis* X *S. groen-*

landica (*Bot. Gaz.* 66:342-343, Oct., 1918). His opening sentence reads: "The following specimens look to me more or less like forms that might be taken for *S. fullertonensis* X *S. groenlandica*." *S. fullertonensis*, as noted above, is a trailing, long-peduncled species related to *S. brachycarpa* Nutt. of Section *Glaucæ*. *S. groenlandica* is the former name of the prostrate *S. arctophila* Ckll. of Section *Ovalifoliae*. Note the uncertainty evidenced by Schneider's phrases: "look to me", "more or less" and "might be taken".

In his 10-line description, Schneider pictures a prostrate plant with leaves broadly ovate- or obovate-elliptical, oval, or obovate-oblong, with acute and often plicate apices, the bases rounded or broadly cuneate, the mostly glabrous upper surface shining green, and the lower surface glaucous and distinctly reticulate. The bracts were broadly obovate but he does not state their color. As representing his supposed hybrid, he cites nine specimens collected from the west side of James Bay and Hudson Bay northward to Bathurst Inlet at Lat. 67°-68° N., Long. 109°-111° W. These specimens actually represent that extreme part of *S. anglorum* and/or var. *leophophylla* with the broadest, though not the largest, leaves, and therefore most resembling those of *S. arctophila*.

Three months later, in his third paper, Schneider redescribed his supposed hybrid as a new species, *S. hudsonensis* (*Bot. Gaz.* 67:57-58, Jan., 1919), and correctly assigned it to Section *Ovalifoliae*. This Section includes *S. arctica* Pallas of western Canada and Alaska; *S. anglorum* Chamisso, widely distributed across Canada as species and varieties; and *S. arctophila* Ckll. of eastern Canada and Greenland. His 10-line description refers to the former equally brief description but now the leaves are narrower and more acute, up to 3.5 by 1.7-2 cm., and the capsules, formerly 7 mm., now are 9 mm. long.

Schneider states that his new species is:—

"... closely related to *S. arctophila*, from which it chiefly differs in the shorter pedicels and the more elongated gland. Judging by the flowers alone, one might be inclined to take it for a form of *S. anglorum*, but the leaves are mostly without any trace of stomata in the upper epidermis, and their color and texture are more like in *S. arctophila* . . . Unfortunately I have

not yet seen young female or male flowers, and further investigation is needed to elucidate the real affinity of this form . . ."

Schneider refers to the specimens cited under his previously supposed hybrid and cites four additional specimens collected by the Prebles on the lower west side of Hudson Bay, their Nos. 43 and 46 being the pistillate and staminate types, respectively. As noted above, the leaves described for the hybrid were exactly those of the broader-leaved aspects of *S. anglorum* Chamisso, but not including their larger leaf dimensions. The change in leaf description for *S. hudsonensis* merely recognizes the very common variation in the direction of Schneider's var. *antiplasta* of *S. anglorum* Cham. It also represents the relatively narrow leaves found commonly on heavily fruiting twigs, where the nutrients are used to develop the heavy crop of seeds and the leaves remain small. Furthermore, it represents the normal shape of the young and still developing leaves on many specimens of *S. anglorum* in the flowering stages. Schneider said (quotation above) that he had not seen young flowers of either sex in *S. hudsonensis*. He certainly had seen them for *S. anglorum*, judging by annotated specimens.

Actually, both the supposed hybrid and the later alleged new species are *S. anglorum* Chamisso, an old, well-known, and widely distributed Canadian species. Why did Schneider not recognize that his material belonged to that species? We can only guess. The workings of the human mind (including my own) are past finding out. It may be worth while, however, to speculate on possible reasons, as an aid to preventing similar errors in future.

Schneider's first study covered Section *Ovalifoliae*: "The species related to *S. arctica* Pall." (Bot. Gaz. 66:116-142, Aug., 1918). *S. anglorum* is the most widely distributed species in this Section. Schneider devoted 9.3 pages (l.c. 126-135) to a discussion of it and to the publication of three new varieties. Of this space, 4.5 pages (126-130) were devoted to the synonymy, original descriptions, types, and an 11-line description of *S. anglorum*. Schneider did not have access to the type and contented himself with a brief description based on those of Brown and Richardson. He studied and annotated numerous specimens as *S. anglorum* but cited none of them. Nor did

he amplify his description to include the variations in the abundant material so studied. It seems certain that, because he did not describe *S. anglorum* fully, he gained no clear mental picture of it and therefore did not remember it clearly later as he studied other Sections but turned up additional abundant material belonging to *S. anglorum*.

On the other hand, his three new varieties of *S. anglorum* were treated with unusual fullness. Var. *kophophylla*, with short, broad, relatively obovate leaves, got a 44-line description and 15 specimens cited. It bears the same relation to *S. anglorum* that var. *Macounii* bears to *S. cordifolia*. Var. *araioclada* had a 25-line description and 22 specimens cited, while var. *antiplasta* had a 22-line description and 5 specimens cited. His var. *antiplasta* had leaves narrowly oval, elliptical-oblong, narrowly obovate-oblong, or sometimes oblanceolate, rarely elliptical or obovate-elliptical, more or less acute at both ends, with apices often plicate, 1.5-3 cm. long by 1-1.5 or rarely 1.8 cm. wide. Only 5 specimens, all from the Gaspé Peninsula of Quebec, were cited. The abundant similar material from the Hudson Bay area and northward was completely omitted.

It seems certain that his obsession regarding the diagnostic value of stomas in the upper leaf surface (see quotation above) was largely responsible for this rejection of annotated material. His failure to record a complete description of *S. anglorum* in his first paper probably was a second factor contributing to the error. An accurate concept of *S. anglorum* would have saved the publication of *S. hudsonensis* and greatly extended the north-western range of his var. *antiplasta*, the narrow-leaved form of *S. anglorum*.

In conclusion, it may be stated definitely: (a), that the specimens cited were not hybrids of the two species named; (b), that they did not represent a new species, *S. hudsonensis*; (c), that they represented the normally variable *S. anglorum* Chamisso and its varieties, along with many other specimens annotated as that species but not cited or described; and (d), that *S. hudsonensis* certainly is a synonym of *S. anglorum*, and apparently a partial synonym of its var. *antiplasta*² also.

²) Recently, Dr. Fernald (Rhodora 48:44, Mar., 1946) transferred *S. anglorum* var. *antiplasta* Schneider to *S. arctica* Pallas, var. *antiplasta* (Schn.) comb. nov., without explanation.

NOTES ON AN ANTELOPE FIGHT¹

JIM CHAPMAN,

Kaslo, British Columbia.

SINCE 1934 pronghorn antelope (*Antilocapra americana* (Ord)) have been fairly common in the region north of the South Saskatchewan river near Empress and Estuary, at the border of Alberta and Saskatchewan. I lived in the region until last year and frequently had an opportunity to observe the behavior of these animals. When Dr. A. L. Rand was in the district in 1945 I briefly described a fight which I had witnessed between two bucks. He asked, for the sake of scientific record, that I write an account of it.

At the time when I witnessed the fight in September, 1944, I took notes. Part of the following is quoted almost directly from them.

For several years previous to this time we had noticed a very large buck with a dark face and heavy horns in the vicinity where we lived. We presume that the dark faced animal involved in the fight was one and the same, although there is of course no proof.

On the evening of September 20, 1944, my wife and I arrived home to find that a big dark-faced buck antelope and his harem of twenty does were lying at the edge of a dry slough about 300 yards behind the house. This was both strange and remarkable. Although this herd had previously been in our pasture they had never dared to come so close to the buildings.

Some of the antelope stood up, including the buck. We noticed at once that he was injured. He kept turning his muzzle to lick his right hind leg. Within five minutes he lay down and got up twice.

With the field glasses I crept closer, hoping to get a better look. A doe saw me and at once the herd was off. The buck was left far behind within a hundred yards. The does stopped and waited for him. This was repeated several times until they got out of the pasture.

Here they entered a large open field and we gave chase in the car, hoping to discover what was wrong with the buck. In a wild ride across the prairie we overtook the herd (around 40 miles an hour) and discovered that the buck, although scarred and blood splotted, was more stiff than injured. When pressed he could run well enough. Obviously he had had a fight with another of his kind.

It appeared likely that the old king had brought his harem close to the buildings in order to escape! Rather a cunning trick to say the least.

Immediately we wondered what would happen. Next morning we were out in the hills. Sure enough we found a second buck around the herd. He was not so large as the dark-faced one. Nor were his horns so heavy. But he was exceedingly nimble. The dark-faced one was still very stiff but had worked off his lameness.

Each time the smaller buck got near to the herd the old king drove him away angrily. His initial rushes were extremely swift. He reminded us of a rooster attacking a rival because of the way he lowered and thrust forward his head and neck. Occasionally the king drove the smaller buck for as far as three or four hundred yards. Once they came quite close to where we were lying on a hill and the dark-faced buck looked very angry with his mane bristling and rump patch raised. The other did not seem ruffled or particularly afraid.

The herd gradually worked east, led by a large old doe, while the two bucks continued to skirmish around the fringes. By one o'clock they had gone about two miles. We were famished and went home for something to eat, returning as soon as possible. The herd had vanished. We searched the hills and flats with our binoculars and continued east for several miles. Then we took a loop north and at last found them up in a higher range of hills, still racing about. By this time it was nearing dusk.

We could see that the old dark-faced buck had tired. Instead of running so much he

¹ Received for publication April 9, 1947.

would walk around the fringe of the herd, nose close to the ground like a bull in a fighting mood. When the young buck got too close he flung himself into a charge, usually stopping within fifty yards.

During the day it had appeared that two does were in heat. The old buck mounted several times. Only once were they turned broadside so that we could see clearly. His position was similar to other animals except possibly in a more upright position. We were too far off to be certain whether or not he grasped the female with his forelegs, but we were inclined to think not. If so it was momentary. He then reared convulsively upward and forward until he was standing straight up on his hind legs. The terrific thrust hurled the doe forward several feet and they were separated almost instantly. The whole act took possibly three seconds.

The other buck also mounted once or twice but was always driven off. Only the two does showed any interest in the intruder. The other eighteen were skittish and avoided him noticeably.

On the morning of the 23rd the dark-faced buck was so tired that he seemed hardly able to hold up his big head. The younger buck was not only spry but during the night he had apparently spirited away nine of the does because only eleven were left.

During the morning the youngster got bolder and bolder and eventually at about eleven thirty he chose to fight. They were on a little rounded knoll almost half a mile from where we lay on a hilltop. (Incidentally it was only with the greatest difficulty that we kept the herd in sight at all. Antelope are extremely keen-eyed and we dared not get too close for this season, and also because of the racing and circling bucks. The bodies of the red and white does blended perfectly with the faded autumn grass and the bucks were more easily seen only because of their dark horns and faces.)

The beginning of the fight was both sudden and unexpected. When the old buck charged, the younger one stood his ground. They met head-on, rebounded, then began a titanic pushing match. It seemed from the first that the dark-faced buck was pressed back-

wards. They whirled and spun, switching ends so rapidly that it was difficult to be sure which was which. They parted once or twice to rest and glare at one another, then commenced pushing again. Each appeared to drop to his knees when the pressure was most fierce. Dust rose, almost obscuring their bodies and the flashes of their creamy white rump patches. This went on for approximately five minutes.

Suddenly they emerged clearly out of the dusty haze on the rounded knoll. The dark-faced buck was backing up at frantic speed, pressed to a faster and faster gait by the other. It seemed incredible that any animal could run backward so fast. Then the dark-faced buck fell. White underparts flashed and legs kicked in the air as he rolled. The smaller buck was upon him, striking with forefeet and piercing him with his horns.

Probably the dark-faced buck knew it was a matter of life and death. In any event he was on his feet in a flash and racing away at a terrific speed. The other buck followed close on his heels, horns low. But at no time was he quite able to overtake the dark-faced one. Terror had given the defeated buck an added bit of speed.

After half a mile, up hill and down, the winner turned back. The loser continued to run for almost a mile further, straight away from the does and toward the South Saskatchewan river some two miles away.

The young buck took command of the herd and he wielded authority because the does obeyed when he drove them. They vanished eastward, bouncing white dots, and we did not see them in our region again all fall.

The dark-faced buck remained in the valley of the South Saskatchewan river for three days. He was so stiff that he could scarcely get out of the way of our car. It was on the second of October when we saw him in our pasture field near the house. He was alone and drifting aimlessly about. At one time he visited the slough behind the house. Here he threshed his horns in a clump of rose bushes. We have never seen him since. There was an open season on antelope that fall. No doubt he fell to a hunter's gun.

THE ORCHIDS OF THE CYPRESS HILLS¹

R. G. H. CORMACK,

Department of Botany, University of Alberta, Edmonton.

FROM June 7 to August 6, 1945, the writer had occasion to visit the Cypress Hills for the purpose of making a forest survey for the Provincial Department of Lands and Mines (Forest Service).

The Cypress Hills constitute a prominent landmark in the southeastern corner of the Province of Alberta. They are situated in the Medicine Hat region about forty miles north of the international boundary and extend eastward into the Province of Saskatchewan. The hills consist of a level plateau, which is from two to five miles in width and has a steep eroded north-escarpment leading to the lower surrounding plain. On the north side, there is a fairly rapid climb from the base of the hills with an elevation of 4,200 feet to the west end of the plateau with an elevation of 4,800 feet. It is believed that this highest part of the plateau was not covered by the continental ice sheet.

The irregular topography of the hills, the densely wooded slopes, coulees and deep ravines, drained by numerous springs and small creeks, contrast sharply with the surrounding, level, semi-arid treeless country. It is little wonder that Captain Palliser writing in his diary on July 28, 1859, described these green wooded hills as "a perfect oasis in the desert".

The wooded areas are confined to many deep ravines, the whole north escarpment and the highest ground on the plateau. The general appearance of the forest is that of a mixed, uneven-aged forest of lodgepole pine, white spruce, aspen and balsam poplar. It is evident that pine and poplar have followed fire and that spruce represents the climax forest tree for the existing climatic conditions. The value of these wooded hills for timber, wildlife, recreational purposes and for storing moisture of snow and rain makes this forest reserve of great importance.

As a result of fire, continuous logging and grazing, undisturbed wooded areas occur only in the deepest ravines and gullies. Here, orchids and other native plants flourish either in mossy spruce groves along the banks of springs and creeks or in springy ground lightly overgrown with spruce and willows.

It was in such a spot that thirteen varieties of orchids were found. This may seem like a very small number to those accustomed to collecting orchids in Eastern Canada, but in Alberta, where orchids are much rarer flowers, this number, found in such profusion and within such a small localized region is an unusual event. Although most of these orchids are of common occurrence in Alberta and have a wide range in Canada, two are very rare and worthy of special note.

The most striking orchid was a variety of the Small Round Leaf Orchis (*Orchis rotundifolia* Banks). This variety is similar in size and general appearance to the species except for the lip which is marked by two broad reddish purple stripes instead of the usual spots. These plants were found growing in clumps along the mossy margins of a most beautiful little spring which trickled out of the base of a steep cut-bank at the very top of the escarpment. There were twenty-three plants in one clump and fourteen in another. For a distance of five or six feet, approximately fifty plants were found along the water's edge. In the same spot, plants of the usual spotted type were much more numerous. Although I had occasion to survey almost every deep ravine and coulee in the hills and saw hundreds of the spotted type, I never again encountered plants with the striped lip.

Although unknown to me at the time, this beautiful variety had been found once before in the Cypress Hills by Mr. W. C. McCalla of Calgary on June 27, 1932. At that time Mr. McCalla found seven or eight striped-lip plants growing in damp mossy woods at the base of the escarpment in the vicinity of Elkwater Lake. A beautiful photograph of this plant taken by Mr. McCalla together with a descriptive note by Mr. Henry Mousley appears in the Canadian Field-Naturalist for May, 1941. In this article Mr. Mousley proposes the variety name *Orchis rotundifolia* Banks var. *lineata*. Thus the plants collected in the present survey represent the second record of the striped-lip variety for the continent.

¹ Received for publication February 4, 1947.

Another rare find was a striking yellow Coral Root Orchid. It was found growing at the base of an old windfall in an open wood of conifers and aspen poplar. The single yellow-coloured flowering stalk, eleven inches tall bore eleven large flowers. The flowers were in full bloom and resembled those of *Corallorrhiza striata* Lindl. in almost every detail except that they were pale yellow in colour and unstriped. A photograph of this plant together with a specimen of the usual striped form is reproduced.

Upon my return to Edmonton this plant was submitted in turn to Dr. D. S. Correll of Harvard University and to Mr. A. E. Porsild, curator of the herbarium, National Museum of Canada, for identification. Dr. Correll considers this plant to be a yellow form of *C. striata* Lindl. and to be identical with the typical form of the species. He also believes that this is the form described by Rydberg as *C. ochroleuca* in the Bull. Torrey Club 31:402. (1904). After examining this specimen Mr. Porsild is also convinced that it is the form described as *C. ochroleuca* Rydberg and concludes that it more rightly should be considered a variety of *C. striata* Lindl. In any event, as far as I can ascertain this Coral Root is new to the flora of Alberta and possibly to all Canada.

In conclusion, I wish to thank Dr. D. S. Correll and Mr. A. E. Porsild for their kindness in identifying the yellow Coral Root Orchid.

ANNOTATED LIST OF SPECIES

CALYPSO (*Calypso bulbosa* (L.) Oakes). — Comparatively rare; here and there in mossy pine-spruce woods. In flower from June 8th to nearly the end of the month.

NORTHERN TWAYBLADE (*Listera borealis* Morong). — Sparingly found among moss and liverworts at the edge of springs and small creeks in undisturbed spruce woods. In flower during the whole of July.

FRANKLIN'S LADY SLIPPER (*Cypripedium passerinum* Richardson). — Here and there in clumps under spruce, either at the edge of wet sedgy areas or along the mossy margins of springs and creeks. First observed in bud on July 10th and in bloom to the end of the month.

SMALL ROUND-LEAF ORCHIS (*Orchis rotundifolia* Banks). — Common and abundant on mossy banks of springs and creeks or

around the edge of springy sedgy ground lightly overgrown with spruce. In flower from July 3 to nearly the end of the month.

Striped-lip variety of SMALL ROUND-LEAF ORCHIS (*Orchis rotundifolia* Banks var. *lineata* Mousley). — Very rare; seen in only one location at the edge of a tiny spring, under spruce. About fifty plants in all. First seen in flower on July 3 (see above).

BLUNT-LEAF ORCHID (*Habenaria obtusata* Pursh). — Not common but fairly abundant in small patches in mossy depressions under spruce. First observed on June 26 and in flower until the middle of July.

TALL LEAFY GREEN ORCHID (*Habenaria hyperborea* (L.) R. Br.). — Common and relatively abundant in wet sedgy areas sparsely overgrown with spruce. Extremely variable in size and general habit. In flower during the whole of July.

BRACTED ORCHID (*Habenaria viridis* (L.) R. Br. var. *bracteata* (Muhl.) A. Gray). — Fairly common in moist pine-spruce woods. In flower from July 5 until nearly the end of the month.

EARLY CORAL ROOT (*Corallorrhiza trifida* Chatelain). — Common but not abundant in mixed woods. First observed on June 13 and in flower for several weeks.

SPOTTED CORAL ROOT (*Corallorrhiza maculata* Raf.). — Not abundant; here and there in coniferous woods. Occurs usually in compact clumps of several flowering stalks. First observed on July 12, and in flower to the end of the month.

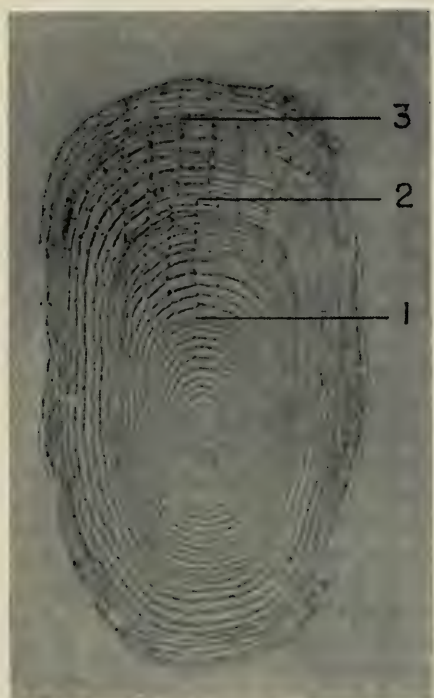
STRIPED CORAL ROOT (*Corallorrhiza striata* Lindl.). — Common though not abundant in a variety of habitats in mixed stands of conifers and aspen poplar. In flower from June 26 to the middle of July.

Yellow form of STRIPED CORAL ROOT (*Corallorrhiza striata* Lindl. or *C. ochroleuca* Rydb.). — Exceedingly rare; only one flowering stalk observed in open mixed woods on July 12. Not previously reported for Alberta. (See above).

HOODED LADIES' TRESSES (*Spiranthes Romanzoffiana* Cham.). — Common and fairly abundant in springy ground at the edge of willow thickets, depressions in open fields and in the vicinity of abandoned beaver ponds. Coming into flower during the first week of August.



Corallorrhiza striata Lindl. (left) X $\frac{1}{2}$. *Corallorrhiza ochroleuca* Rydb. (right) X $\frac{1}{2}$.



A



B

Fig. 1. — *Microgadus tomcod* caught in Lake St. John in 1944, scales taken from left side of fish, between lateral line and vent. (Photographs by Cécile Lanouette).

A—July 4

B—July 13

THE TOMCOD (*MICROGADUS TOMCOD*) AS A PERMANENT FRESH-WATER RESIDENT OF LAKE ST. JOHN, PROVINCE OF QUEBEC¹

By VIANNEY LEGENDRE and ROBERT LAGUEUX,

Quebec Biological Bureau (2)

LANDLOCKED species of fishes have always been a matter of great interest to both fishermen and ichthyologists. Cases of landlocked Salmon, Smelt and Stickleback are well known, but during the summer of 1944, while surveys were being made and statistics established for commercial fisheries, with bottom nets in Lake St. John, Saguenay County, Province of Quebec, it was a surprise to find in the nets many specimens of Tomcod or Frostfish [*Microgadus tomcod* (Walbaum) 1792]. From July 3 to September 6, fifty individual fish were caught, weighing between 1 and 3 ounces, and at depths of 20 to 50 feet. The meshes of the nets in which the fish were taken measured 1¾ to 2 inches square. All the Tomcods caught could have swum easily through such nets, but it was amazing to see that these fishes were caught by the mouth; they had been, undoubtedly, swimming with large schools, and had, by chance, bitten the net-string and become entangled.

Lake St. John seems to exist under peculiar ecological conditions, probably owing to the large dimensions of the lake, and the remains of the Champlain Sea influence, as there are found here at least three other species of landlocked fish; the Ouananiche (*Salmo salar ouananiche*), a fresh-water form of the Atlantic Salmon; the Smelt (*Osmerus mordax*), which is found in innumerable schools; and the Three-spined Stickleback (*Gasterosteus aculeatus*). During the same nettings as mentioned above, it also happened

quite often that Smelts were taken in the same way, i.e. by the teeth. Besides the entangled Frostfish, individuals of the other well known fresh-water gadid, *Lota lota maculosa* (Burbot), were often gilled.

In the Lake St. John region, people are well acquainted with the fact that Tomcods live in the great depths of the Lake, and that these fish can be caught all year round. Old fishermen have reported such species for the past fifty years. In relation to such more or less reliable reports, it is worthwhile to recall that the high power-house of Ile Maligne (110 feet in height) and the six accessory cutaways, the lowest gates of which are 17.5 feet in height, were established in 1923 on the Grande and Petite Décharges of Lake St. John. In 1931, the Châte-à-Caron powerhouse (200 feet in height) was built right across the Saguenay River. Therefore, it is well demonstrated that the *Microgadus* is actually native to Lake St. John as the specimens at hand are about 3 years old (Figure 1, scales from both specimens kept in collection).

Numerous specimens are being collected from Lake St. John drainage and from various localities along the St. Lawrence Gulf, River and tributaries to determine whether or not two subspecies of *Microgadus tomcod* are represented.

¹) Received for publication March 12, 1947.

²) This bureau is under the direction of Gustave Prévost, Professor of Biology at the Université de Montréal.

AN UNUSUAL ABUNDANCE OF VELELLA VELELLA LINNÉ (COELENTERATA: SIPHONOPHORAE) IN INSHORE WATERS.¹

By G. CLIFFORD CARL

Provincial Museum, Victoria, B.C.

VELELLA, a colonial animal related to the more familiar "Portuguese Man O'War", is normally found in the open waters of the Pacific northward to Japan along the Asiatic coast west to Vancouver Island, Queen Charlotte Islands and occasionally to the Gulf of Alaska on the North American coast. In the spring of 1946 this coelenterate appeared in Juan de Fuca Strait in large numbers and skeletal remains were cast up on beaches in the Victoria area where they attracted wide attention. Although it is apparently not unusual for *Velella* to appear in small numbers in the waters off Victoria this seems to be the first instance of this organism occurring in quantity in inshore waters.

Velella is commonly seen each year off the West Coast of Vancouver Island. Mr. Patrick W. Martin, field biologist of Victoria, reports that these organisms are noted usually in July and August and that fishermen believe their presence is indicative of good fishing. That fish may feed upon these colonies is demonstrated by the fact that specimens have been found in the stomachs of Coho salmon taken in waters frequented by this siphonophoran.

They occur in immense numbers; in early morning when the sea is calm extensive patches of the ocean are coloured violet-blue by the presence of these animals which float with the sail projecting above the surface. When the water is disturbed by wind the colonies sink to a depth of several feet.

Archibald Menzies writes of seeing these animals in vast quantities on April 8, 1792, during calm weather off the coast of Northern California. ("Menzies' Journal of Vancouver's Voyage, April to October 1792." Memoir No. V, Archives of British Columbia, 1923, pp. 1-3). The late Dr. C. McLean Fraser, Professor Emeritus, Department of Zoology, University of British Columbia, informed me that on a trip to Honolulu in 1920 the ship on which he was a passenger passed through large numbers of *Velella* for four days after leaving Cape Flattery. Dr. Fraser

also told me that in 1926 they were so abundant off the coast of Vancouver Island and the Queen Charlotte Islands that they arrested the attention of shipping men and fishermen to such an extent that the local papers were filled with reports covering them for some considerable time. Most accounts at this time referred to these creatures as "Portuguese Men O' War" or "Nautilus"; some sea-faring men have also given them the name "By-the-wind Sailors".

H. C. Williamson ("Notes on the Occurrence of Various Animals on the Fishing Grounds on the Coast of British Columbia." Can. Field-Nat. XLIV, No. 7, Oct. 1930) also records their presence in great numbers off Barkley Sound in 1926. A few *velellae* were observed early in 1927 and large numbers of small ones were present in 1928 at various places off the West Coast but they appeared to be absent in 1929 according to this writer.

Velella colonies apparently depend for their food supply upon the ocean currents and since these vary in strength in any one area from year to year and also vary in their position the abundance of these animals is likely to vary greatly from year to year in any one place.

The skeletal remains of these colonies float by reason of the presence of air chambers and are sometimes cast up on beaches in great numbers. Mr. E. G. Hart of Victoria tells of seeing extensive windrows of these skeletons for miles along the shore in the vicinity of Nootka Island in July 1934.

It is probably not unusual for skeletons of *Velella* to wash ashore along the more exposed portions of our coast but it is apparently unusual for them to appear in large numbers in protected waters. The first indication of their presence in the vicinity of Victoria in 1946 was the finding of skeletons at Jordan River about 40 miles west of Victoria on March 14. By March 30 skeletal remains began to appear on local beaches such as at Clover Point and many enquiries as to their identity were received at the Museum. By

¹ Received for publication February 24, 1947.



Fig. 1 Skeletal remains of *Velella velella* on beach, Victoria, B.C., April 1, 1946.

Photo By G. C. Rarl.



Fig. 2. Details of skeletal remains of compound jellyfish, *Velella velella*.

Photo by Wm. Halkett.

THE SWAMP RATTLESNAKE IN INLAND SOUTHWESTERN ONTARIO¹

W. SHERWOOD FOX,

London, Ontario.

MR. E. B. S. LOGIER in his brochure "The Reptiles of Ontario",² p. 39, thus defines the distribution in Ontario of the Massasauga, or Swamp, or Little Gray Rattlesnake—*Sistrurus catenatus catenatus* (Rafinesque):

" . . . Southwestern Ontario at least to northern Parry Sound and Manitoulin Districts.

"Not now plentiful in Ontario. Still fairly common in the Bruce Peninsula and not rare along the eastern shore of the Georgian Bay and on some of the adjacent islands; found occasionally in the general vicinity of Lake Erie. It probably occurs along the whole Georgian Bay-Lake Huron-Lake Erie shoreline, thinning out and disappearing inland. All our positive records are within about twenty miles of this shoreline. We have reports from further east, the most easterly being from Prince Edward County. We have recently had a report of its occurrence at Cobalt."

This is an eminently accurate statement and yet is flexible enough to prepare us not to be surprised if the Massasauga is from time to time reported as having been found farther inland than indicated in these lines. For instance, the Press recently carried the story that a specimen had been seen at Gravenhurst, the most southerly point on Lake Muskoka, which in a direct line is at least 25 miles distant from the nearest spot on the Georgian Bay. Again, since it is a matter of historical record that the species is native to the whole Ontario shore of Lake Erie, one need not wonder on being told that only a fortnight ago a Massasauga was killed at Newbury, Middlesex County, which is twenty-five miles from Lake Erie.

At four o'clock in the afternoon of Saturday, October 4, Freddie Bunda, two-and-a-half year son of Mr. and Mrs. Fred Bunda who live on a farm on the outskirts of the village of

Newbury, was bitten on the arm. The child's mother immediately killed the reptile with a spade that lay near by and with little delay took the child to Dr. T. P. Kearns of Wardsville, who gave the wound appropriate initial attention. The next day Freddie was removed to the Memorial Children's Hospital, London. The physicians there, as one would expect in Ontario, at once realized they had had no experience with cases of snakebite and sought information as to treatment and prognosis. It so happened that I was one of those to whom they appealed, not because they expected any medical competency from me, but rather in the hope that from my knowledge of the history of several cases of Massasauga bites they might get some idea of the course this particular case would take. Keenly aware of the grave responsibility I was assuming I assured the physicians that in the light of what I knew the fact the child was still alive twenty-four hours after he had been bitten and without having been given an injection of antivenin, would warrant confidence in his recovery. Happily, this prediction proved to be true.

The results of the bite in this case were typical of the effects of the venom of the Massasauga. The child's arm swelled to double its normal size, the swelling extending to the middle line of the chest. Besides, there was a protracted nasal haemorrhage. One of the effects of the venom is to break down the red corpuscles and the walls of the capillaries in various parts of the body. The victim's escape from paralysis in the bitten member is probably due to the treatment given him by Dr. Kearns. In one case I know the greater part of a day went by before a child of six received any treatment whatsoever for a vicious bite on the leg by a Massasauga; the child's mother had been utterly indifferent to the seriousness of the wound, unwilling to tear herself away from the joys of a lakeside picnic in The Bruce. Because of this cruel neglect the little lad was unable to walk on the injured leg until the following spring.

¹ Received for publication October 27, 1947.

² Handbook No. 4, Royal Ontario Museum of Zoology, Toronto, 1939.

The snake that bit Freddie Bunda is now permanently preserved in the zoological laboratory of the University of Western Ontario. It is a mature specimen, though far from being large, twenty and a half inches in length. It is a good example of the dark or so-called black phase in coloration and markings. Its tail bears two rattles and an end button.

The reason why the University desired to acquire the snake was to determine its species beyond doubt. Years ago a Connecticut herpetologist had asked if the University had any knowledge of the existence of the Timber or Banded Rattlesnake (*Crotalus horridus horridus* Linné) in the swampy area locally known as Skunk's Misery which stretches westward from New-

bury several miles. The possibility that the inquirer's question had been inspired by a discovery of a long-forgotten authentic record of the occurrence of this species in the region, prompted the University to make sure that the reptile recently killed near Newbury was correctly identified. That it would turn out to be a Massasauga was suspected by all concerned, since its kind had been seen there many times from the days of the earliest settlers to the present. The final proof that the Newbury specimen is of that species leaves the Niagara Glen in the position of now being the only place in Ontario in which the Timber Rattlesnake has survived.³

³) Since this paper was prepared the writer has come across a record of the Timber Rattler being found at Bradley's Marsh at the point where the Thames enters Lake St. Clair.

DISTRIBUTION OF THE HOUSE MOUSE IN ALBERTA¹

JOHN H. BROWN,

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DURING the summer of 1946 the field crews of this division investigated the probable reservoirs of diseases of animals transmittable to man by arthropods. The investigation was mainly concerned with rodent hosts of infection, consequently a large number of rodents of the subfamily Cricetinae were taken.

The collecting area comprised various parts of Alberta from the Montana border to Peace River and Dawson Creek, and from the Saskatchewan border to the British Columbia border.

A total of 301 mice were taken. Of these 111 were males, 110 were females and 80 specimens did not have the sex determined. Three main species were represented—217

specimens of *Peromyscus maniculatus borealis* and *Peromyscus maniculatus nebrascensis*², 42 specimens of *Clethrionomys gapperi athabascaae*, 39 specimens of *Mus musculus*, 2 specimens of *Microtus pennsylvanicus drummondi*, and 1 shrew (species not determined). The determinations were made by Dr. R. T. Orr, California Academy of Science, San Francisco.

Mus musculus was taken at Lethbridge, High River, Vulcan, Calgary, Red Deer, Wainwright, Thorsby, Edmonton and Grande Prairie. This distribution indicates that *Mus musculus* is well established in Alberta.

²) The editor has examined over two hundred specimens of *P. maniculatus* from southern Alberta and southwestern Saskatchewan and refers them to *P. m. osgoodi* Mearns (1911). *P. m. nebrascensis* (Coues, 1877) is not considered to range north of Colorado and Wyoming, "possibly extending north to western North Dakota" (Miller, 1924, 329). — R. M. A.

¹) Received for publication Feb. 15, 1947.

NOTES AND OBSERVATIONS

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THE GENUS *DRYAS* IN NORTH AMERICA.—In the preparation of my recent revision of *Dryas* published in Vol. 61:175-192 (1947) of this Journal, I erroneously included the White Mts. of New Hampshire in the range given for *Dryas integrifolia* (pp. 177, 179, 188 and map in fig. 4) thereby perpetuating the error started by Pursh in Fl. Am. Sept. 350 (1814) and continued in most subsequent treatments, including N. Am. Flora Vol. 22, 5:400 (1913). I should have been forewarned by the fact that *Dryas integrifolia* had been dropped from the 7th edition of Gray's Manual, 1908, because Professor M. L. Fernald, in Rhodora 5:281-283 (1903), had pointed out that the specimen which Pursh saw in Bank's Herbarium, and cited under his *Dryas tenella*, from "—the white hills of New Hampshire. Dr. Peck", in all probability was collected by Banks in Newfoundland rather than in New Hampshire where "since that time American botanists have sought in vain for the plant and have wished in vain to have known Peck's station in the 'White Hills'."

Dr. T. W. Böcher of the Botanical Museum, Copenhagen, has kindly called my attention to inaccuracies in the range given by me for *Dr. integrifolia* for S. E. Greenland where, between Cape Farewell and the Blosseville Coast (60° - 69° lat.), that species thus far is known only from 16 stations, all in the Angmagssalik District (see Böcher, Medd. om Grl. 106, 2, maps fig. 66 & 67, pp. 129 & 131, 1938).

On the southern part of the west coast, south of 64° lat. *Dr. integrifolia* tends to be either alpine or restricted to the innermost and continental part of the fiords. Future botanical exploration of the S.E. coast of Greenland may prove that *Dr. integrifolia* also there occurs in alpine stations.

On page 186, under the synonymy of *Dr. Hookeriana*, I inadvertently cited *Dr. octopetala* ssp. *Hookeriana* Hult. Fl. Al. & Yukon 6:1046 (1940). This synonym properly belongs under *Dr. alaskensis* (p. 187) where it is correctly used.

A few typographical errors have crept in: p. 184 1st col., line 33 delete *long*. p. 187 2nd col., line 10, for *augustata* read *angustata*

p. 187 2nd col., line 11, for *truncata* read *truncata*

p. 187 2nd col., line 21, for *untrisque* read *utrinque*

p. 187 2nd col., line 22, delete comma after *margin*

p. 188 2nd col., line 13, for *Edge's* read *Egede's*

plate 11, line 5, for *lower* read *flower*

A. E. PORSTIL

NOTE ON THE RED CROSSBILLS IN THE OTTAWA DISTRICT. — Recently in going over the series of red crossbills, *Loxia curvirostra*, in the National Museum of Canada, and using Griscom's "A Monographic Study of the Red Crossbill" Proc. Boston Soc. Nat. Hist., 41, No. 5, pp. 77-210, 1937, I found several records that are not included in Lloyd's "The Birds of Ottawa, 1944", Canadian Field-Nat., 58, pp. 143-175, 1944.

Lloyd, p. 173 lists but one form of the red crossbill, *Loxia curvirostra pusilla* Gloger, stating that it is an erratic visitor; has been found here almost every month of the year; sometimes common.

According to Griscom three races of this species have occurred in the Ottawa area; one form that is to be expected as the regular breeding bird; one that is a straggler from the Pacific coast; and one that is a straggler from Newfoundland. Thus the subspecies of the Ottawa district stand as follows:

Loxia curvirostra pusilla Gloger.

NEWFOUNDLAND RED CROSSBILL. (*L. c. perna* of Taverner Birds of Canada, 1934, and A.O.U. Checklist, 1931). A large, rather dark coloured form, with a large bill; wing ♂ 91-96.5; culmen 17-19; depth of bill 10.3-11.5. Ottawa records: Constance Bay; 3 ♂, 1 ♀ Nov. 1916; Hog's Back, 1 ♂ Nov. 5, 1919 (specimens Nat. Mus. Can.).

This subspecies is supposed to breed in Newfoundland, but has wandered as far west as Ontario and as far south as Florida.

Loxia curvirostra minor (Brehm)

AMERICAN RED CROSSBILL. — (*L. c. pusilla* of Taverner, Birds of Canada, 1934; A.O.U. Checklist, 1931; *L. c. neogaea* of Griscom). A medium sized crossbill, smaller than *pusilla* and not as dark in colour; wing ♂ 86.5-91; culmen 15.5-17.5; depth of bill 9-10 (Griscom). This is presumably the common nest-

ing red crossbill from Nova Scotia to Ontario, and probably farther to the northwest, but strangely there is but a single record, for the Ottawa district, a female taken Nov. 5, 1919 at Hog's Back by D. Blakely on the same day he took a specimen of *L. c. pusilla*. The specimen, in the National Museum measures wing 85, culmen 15, depth of bill at base 8.7, and was identified by Griscom, (females average slightly smaller than males.)

There are apparently no records of the species breeding in the Ottawa district.

***Loxia curvirostra sitkensis* Grinnell.**

SITKA RED CROSSBILL. — *L. c. sitkensis* of Taverner, Birds of Canada, 1934; A.O.U. Checklist 1931; *L. c. minor* of Griscom).

The smallest of our crossbills with a short, stubby bill; colour as in *minor*; wing ♂, 81-88.5; culmen 13.5-15; depth of bill 8-8.8 (Griscom).

There is a single record quoted by Griscom pp. 124 and 143, of a female, Ottawa, Oct. 28, 1908, in Ohio State Museum.

This form normally breeds on the humid Pacific coast of British Columbia, but in a number of years there have been flights eastward that have reached the Atlantic states and Ontario.

Griscom, pp. 123-125 summarized and discussed the eastward flights of this form, and pointed out that in 1908-1909 there were records for two other Ontario localities, London and Point Pelee.

There are many points of interest about these birds that would make it an extremely interesting object of study as pointed out by Griscom.

The erratic movements of populations, often over long distance east and west as well as north and south, and the irregularity of their occurrence and nesting, being present in one area for a year or more, and then absent for several years, and the occurrence of different subspecies in the same area, (as the three subspecies at Ottawa, none of them demonstrated as breeding) indicates the need of continued field observations with the collection of specimens to determine what form is present each year.

It might be expected that such apparently irregular movements, presumably correlated with food supply, and the possibility of one subspecies breeding in the range of another, would result in mixing populations, so that subspecies would not be evident, but such seems not to be the case, and most of the subspecies are distinctly characterized.

The physiological aspect of their reproduction, and their moult that correlates with their breeding and may occur at any time of year, is intriguing in view of the work with some other animals, that showed such processes to be controlled by light.

The correlation of bill size with food in the Old World crossbills has been attempted by Lack (Ibis, 1944, pp. 552, 553) who found that even within the species *Loxia curvirostra* a subspecies with a larger bill habitually fed on seeds of conifers with larger, tougher cones. But Griscom (p. 120) has pointed out with the large-billed eastern race *L. a. pusilla*, (on the assumption that Newfoundland is its normal breeding range), its larger bill cannot be correlated with the size and toughness of the cones on which it feeds. The spruces and balsams, that are the common conifers of Newfoundland are exactly the same species as grow throughout the breeding range of the smaller-billed, eastern *minor*. On southward flights, however, both in the Atlantic states and Illinois *pusilla* has been found in numbers only in pitch pine (*Pinus rigida*) or closely related species with tough cone scales. In the interior of North America *Pinus Banksiana* with very tough cone scales forms extensive forests, and here the small-billed *L. c. minor* is presumably the breeding bird.

However Griscom (p. 123) writes in regard to *minor* (= *sitkensis*) of the Pacific coast, the smallest new world crossbill, with a short stubby bill, that "The small stumpy bill of this subspecies can be directly correlated with the thinner scaled spruces and larches, and the papery scaled hemlocks and giant cedar (*Pseudotsuga*) of its normal home".

Thus in Canada there is one positive and one negative correlation in bill size and toughness of cones. — A. L. RAND, National Museum of Canada, Ottawa.

THE SECOND RECORD OF THE LITTLE SHORT-TAILED SHREW IN SOUTHERN ONTARIO. — The first Canadian record for the little short-tailed shrew (*Cryptotis parva* Say) was secured by the Royal Ontario Museum party at Long Point, Norfolk County, Lake Erie, in 1927 (Snyder, L.L. *Cryptotis parva*, a new shrew for the Canadian list. Journ. Mamm. 10: 79-80, 1929). Following this date, in spite of extensive collecting by several mammologists, no further records of this shrew had been obtained.

On September 22, 1941, Mr. D. M. Davies, Mr. G. E. Beare and the writer visited Long Point, with the purpose of obtaining specimens of the little short-tailed shrew. We proceeded south along the western beach for about two miles, turning over driftwood searching for the shrew, but without success. Crossing the sandbank, we reached the edge of the eastern marsh and commenced turning over the piles of accumulated marsh debris. We were immediately successful in capturing one of these shrews, but further intensive search yielded no other specimens. The specimen secured was a male, it measured: length 79.5, tail 18.0, hind foot 12.0 mm. and is at present in my collection. — A. W. F. BANFIELD, Dominion Wildlife Service, Ottawa.

AN ALBINO EVENING GROSBEAK (*Hesperiphona vespertina*). — On September 22, 1947, a large flock of evening grosbeaks were drinking at my lily pond at Crescent. Among them was an albino, a strange lemon-coloured bird very like an overgrown canary. I am sure if this bird had been seen away from the flock it could have been taken for some rare visitant from the tropics.

In the Canadian Field-Naturalist (1938, Vol. 52, No. 4, p. 61) there is a record of an albino white-crowned sparrow (*Zonotrichia leucophrys nuttalli*) which was seen by myself at Surrey Centre, B.C., on April 29, 1937. It was in the company of other sparrows of the same species in normal plumage. — M. W. HOLDOM, Crescent, B.C.

MICHIGAN BROOK LAMPREY AT OWEN SOUND, ONTARIO. — In June, 1947, it was reported to me that lampreys had been seen in the children's wading pool in Harrison Park, Owen Sound, Ontario. On June 26, 1947, I investigated this report and collected a number of specimens, four of which are now in the collection of the Royal Ontario Museum of Zoology. Mr. E. B. S. Logier and I tentatively identified these specimens as the Michigan brook lamprey, *Ichthyomyzon fossor*. This identification was later verified by W. B. Scott of the Royal Ontario Museum of Zoology.

The specimens were taken from a pool about fifteen feet long by six feet wide, with a maximum depth of less than eighteen inches. The bottom of the pool was covered with coarse gravel and occasional flat stones up to about fourteen inches across, under which the lampreys were found hidden sing-

ly or in groups of up to eight. A total of fourteen individuals was counted, although the pool very probably contained more than this.

This pool, which is situated just below the wading pool itself, is fed by a small canal joining the wading pool to the Sydenham River, and empties into the river several hundred yards downstream. A search of this system, including the river itself, failed to disclose any other individuals of this species.

Dymond (A List of The Freshwater Fishes of Canada, Royal Ontario Museum of Zoology, Miscellaneous Publication No. 1, 1947) states that this species has been "recorded for Ontario only from the Thames River system". This record, therefore, would appear to be the first from north of that part of Ontario. — FRED WARBURTON, 444 Second Ave. East, Owen Sound, Ontario.

TWO NEW RECORDS OF UTRICULARIA FOR THE OTTAWA DISTRICT.¹ — During the summer of 1947 a number of collections of *Utricularia* (Bladderwort) were made in the vicinity of Ottawa by members of the staff of the Division of Botany and Plant Pathology. These collections yielded two new records for the District, namely *U. gibba* and *U. resupinata*.

1. *Utricularia gibba* L. Sp. Pl. 18. 1753.

HUMPED BLADDERWORT. — This species was collected by the writer, on September 2, at Charbonneau Lake (elevation approximately 450') in the Laurentian region about 12 miles northeast of Ottawa (PAPINEAU CO.: Templeton Twp., Charbonneau Lake, Calder 1625 (DAO). Only one small colony was seen and this was growing in from 1 to 2 inches of water in a small muddy embayment along the northwest marshy shoreline of the lake. The creeping leafy stems were submerged in a muddy ooze and the 1- to 2-flowered solitary scapes (up to 3.5 cm. high), with their yellow corollas, were just protruding above the surface of the water. In a shallow spring-fed pool a few feet away, free-floating plants of *U. vulgaris* L. were exceedingly common.

In the vegetative state, *U. gibba* may be distinguished from the other North American species by the generally once-dichotomous delicate leaves all of one type, with many bladders, especially near the ends of the leaves. In flower, it may readily be dif-

¹ Contribution No. 944 from the Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Canada.

ferentiated by the stout spur, which is shorter than the lower lip of the laterally flaring corolla.

This species has a wide range, extending from Nova Scotia and Quebec to Southern Ontario (Great Lakes region), and south to Florida and Texas. It is also known from California, the West Indies, and Central America.

2. *Utricularia resupinata* B. D. Greene; Bigel. Fl. Bost. Ed. 3: 10. 1840.

RECLINED BLADDERWORT. — This species is represented by two collections made by W. G. Dore and W. J. Cody on September 16 at a small unnamed lake in the Laurentian region about 17 miles north of Ottawa (GATINEAU CO.: Wakefield Twp., 2 miles north of Wilson Corners, *Dore & Cody 47-1128 & 47-1145* (DAO)). This lake, which is approximately 750' in elevation, just above the upper limit of the Champlain submergence, has clear, slightly brownish water, and is drained by Blackburn Creek, which empties into the, Gatineau River.

A small colony (No. 47-1128) was found growing in from 2 to 3 inches of water along the sandy southeast shoreline of the lake in association with *U. intermedia* Hayne and *Lobelia Dortmanna* L. The submerged leafy stems were rooted in sand and the purple-flowered scapes extended to or just above the surface of the water. This species was

fairly common around the margins of the lake. This was the only station, however, in this general locality at which flowering plants were seen. Along the northwest shoreline, specimens (No. 47-1145) were collected from another colony growing in from 6 to 9 inches of water. This colony was comprised almost entirely of immature fruiting plants, their horizontal leafy stems being embedded in soft organic ooze. The numerous single-fruited upright scapes were all below the surface of the water. *U. vulgaris* was noted in shallow water around the border of the lake.

U. resupinata may be readily differentiated by its paired-bracts, which are united to form a tube, and the small, solitary, upward-facing purple flowers. The range of this species is from Nova Scotia to western Ontario, and south to Illinois and Florida.

For those who are interested in further information about our North American species of *Utricularia*, the following two papers are recommended:—

Aquatic Utricularias by George B. Rossbach. *Rhodora* 41: 113-128. 1939.

Distributional notes on certain aquatic Utricularias in Quebec by George B. Rossbach. *Rhodora* 42: 52-53. 1940.

J. A. CALDER,
Division of Botany, Science Service,
Department of Agriculture, Ottawa.

REVIEWS

The Insect World. — By Hilda T. Harper. MacMillan Co. of Canada, Toronto, 1947, pp. 211, illustrated with pen-and-ink drawings by Zhenya Gay. \$3.25.

This is a non-technical book about the common insects, written by a professional entomologist who is professor of biology at the University of North Carolina. The book is entertainingly written and in 15 chapters introduces the reader to some of the strange mysteries of the insect world, including how insects grow, how they breathe, how they protect themselves and what they eat, to mention but a few of the many subjects about which the layman wonders. At the end of the book is a simple key to help the amateur classify some of the best known orders. Also, there is a list of other books on insects for those who wish to delve deeper into this fascinating subject. — A. E. PORSILD.

THE PLANT GEOGRAPHY OF IOWA. By Bohumil Shimek, edited by H. S. Conard. *University of Iowa Studies in Natural History*, Vol. XVIII, No. 4, 178 pages, April 1948. \$1.00.

The posthumous printing of this unfinished manuscript makes available the matured opinions of one long familiar with the prairie of the mid-west in its original condition. Ecological factors, both present-day and pre-historic, having a bearing on the origin, development and distribution of the vegetation of Iowa are critically discussed in simplified terms. The state of our knowledge on glacial and post-glacial migrations of plants, on the fossil record in peat bogs and the Scarborough deposits and on the prairie-forest ecotone is summarized up to 1932.—W. G. Dore.

Campana, Dr. Elzéar. "Le problème de l'Herbe à Poux, (*Ambrosia artemisiifolia*), (*Ambrosia trifida*), en Gaspésie." *Memoir No. 2, Department of Agriculture, Province of Quebec, 1945.*

The principal objectives of Dr. Campana's researches with the ragweeds were to protect the inhabitants of Gaspé from hay fever, to answer a weed problem on their farms, and to encourage the tourist industry in this economically depressed region. He discusses hay fever, its history, importance and etiology, and discusses very thoroughly the taxonomy, ecology, pollen dissemination and distribution of ragweed. Experimental work reported on includes control and pollen counts. — C. FRANKTON.

WINGS IN THE WILDERNESS. *By Cruickshank, Allan D., Photographer and Lecturer of the National Audubon Society, New York, Oxford University Press (University Avenue, Toronto, 2), 1947. 125 Plates. \$6.25.*

Allan Cruickshank is one of the leading bird photographers and he gives us here reproductions of pictures he has selected from his 30,000 negatives. For the technically interested photographer, the type of camera, lens, stop, and speed for each photograph, is furnished in an appendix. His ability to give these details indicates the care which the author has taken in recording his work as it progressed.

His introduction tells the general procedure in getting bird pictures: "Those who are easily discouraged — should not attempt wildlife photography". The explanations and comments opposite each plate add to the interest, but the main attraction is in the pictures themselves. To view them as one travels in imagination from Canada to Florida and the Atlantic to the Pacific will charm a host of the bird fraternity. — HOYES LLOYD.

FROM EGG TO TADPOLE TO FROG. *By E. B. S. Logier. Handbook No. 5, Royal Ontario Museum of Zoology, Toronto, 16 pp., 1947.*

Illustrated with seventeen drawings and a cover design done in Mr. Logier's usual instructive and interesting style, this concisely written publication is interesting reading for anyone and essential for teaching purposes in educational institutions from coast to coast. — C. L. PATCH.

1946 Annual Report of the Provancher Society of Natural History.

Of particular interest to readers of the Canadian Field-Naturalist in this record of Provancher Club activities are biographical notes on Mr. Henry Mousley, an article by Mr. Mousley on the eastern kingbird, a list of insects taken at Basque and Razade Islands, a well-illustrated article on comparative dental anatomy, and a discussion on the ivory gull together with records of specimens taken in Quebec from 1930-1947. — C. FRANKTON.

Canadian Spring. — *By Florence Page Jaques and illustrations by Francis Lee Jaques. Published by Harper & Brothers, New York. pp. 216, 65 illustrations. Price \$3.50.*

In this latest of an enjoyable series the spring is repeated over and over for the Jaques in their wanderings across the prairies and at the mountains' edge in British Columbia.

To the Jaques this is a new and stimulating country. The variety and abundance of the wildlife in this vast area claims, as always, their first attention. Birds and mammals are described with zest by Mrs. Jaques and captured in fine black and whites by her husband. Equally as compelling are the sketches of the western scene. Those who know the West will never weary of returning to the drawings of roads, fences, grain elevators and broad prairie horizons, which the artist lifts out of the realm of the commonplace.

Their hegira takes them to many interesting natural history sites. On a May morning which seems to Mrs. Jaques out of "Aucassin and Nicolette" they leave the marshes of Delta and its myriad waterfowl, driving to the Riding Mountain Park with its proud elk. The Cypress Hills and Waterton Lakes follow and then they move north to Banff and along the Columbia Icefield Highway to Jasper. They entrain from Edmonton for Hudson Hope in the Peace River Block and on return to Manitoba make a sidetrip to the mining town of Flin Flon.

Mrs. Jaques expresses the mood of the book in: "And spring was so young, in this young country. The just-awakened feeling was like that of the thirteenth-century lyrics:

Woods are in leaf again,

There is no living thing

That is not gay again

This is the spirit of the Canadian spring." — C. FRANKTON.

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Field trips are held during the spring and a special excursion in September.

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In order to meet the demand for back numbers of the publications of the Ottawa Field-Naturalists' Club, the following are urgently needed: Transactions, Ott. Field-Nat. Club, No. 1, 1880.

Ottawa Naturalist

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|----------|------------|------------|----------------------------------------|
| Vol. 4, | No. 6, | Sept., | 1890 |
| Vol. 7, | No. 9, | Dec., | 1893 |
| Vol. 11, | No. 10, | Jan., | 1898 |
| Vol. 11, | No. 11, | Feb., | 1898 |
| Vol. 11, | No. 12, | Mar., | 1898 |
| Vol. 12, | No. 1, | Apr., | 1898 |
| Vol. 12, | No. 4, | July, | 1898 |
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| Vol. 15, | No. 8, | Nov., | 1901 |
| Vol. 17, | No. 12, | Mar., | 1904 (This was marked Vol. 18, No. 12) |
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OTTAWA, Ontario.

The CANADIAN FIELD-NATURALIST

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Div. of Botany, Central Experimental Farm,
OTTAWA, CANADA

TWO NEW THALICTRA FROM WESTERN CANADA^{1, 2}

BERNARD BOIVIN

Division of Botany and Plant Pathology, Department of Agriculture, Ottawa, Canada.

THALICTRUM *Turneri* sp. n. subsectionis *Incurvatorum*. Planta 5-11. dm. glabra. *Folium* basilare unum vel deest, caulinarum 2-4 in planta, inflorescentiae petiolo brevi 0.5-3.0 cm. *Foliolae* 1.5-4.0 cm. lat., summae trilobatae, lobis grosse dentatis, dentibus rotundis 2-3 in lobo. *Inflorescentia* (1)-2-3-(4) dm. long. et 0.4-1.0 dm. lat. elongata angusta, (1)-3-5(8)-folia foliis 1-4 ternatis, ramis adpressis elongatis basis et mediis nudis. *Pedunculi* elongati (1)-2-3-(4) cm. ascendentes paullum incurvati (2)-3-5-(8) in nodo. *Tepala* foemineae ovata 1-2 mm. *Stigma* ca. 2 mm. *Carpella* matura incurvata costata, stipite semi-millimetralli ventro 4.0-4.5 mm. long., 1.5-2.0 mm. lat., late lanceolata. *Tepala* maris 3.0-3.5 mm. *Filamenta* 4.5 mm. *Antherae* 3.4-4.0 mm. acumine submillimetralli. Floret junio. Crescit in sylvis *Populi tremuloidei* apud Fort Saskatchewan in Alberta quo legit G. H. Turner. Typus 4974 (CAN), paratypi 4988 (CAN, DAO), 4875 (CAN, DAO), 4884 (DAO), 4945 (CAN, DAO), 4891 (CAN, DAO), omnes eodem a. D. 1946 lecti.

MANITOBA: A. H. R. Buller, Assiniboine Park, Winnipeg, June 18, 1918 (CAN); J. Hessel, Manitoba Agricultural College, June 27, 1931 (CAN).

SASKATCHEWAN: W. Spreadborough 839, Indian Head (CAN); J. Macoun 12 316, Prince Albert (CAN); J. Macoun 10055, Wood Mt., Medicine Lodge (CAN); J. Macoun 2953, Cypress Hills (CAN); J. Macoun 2952, Crane Lake (CAN); R. C. Russell, Pike Lake, woods, June 8, 1934 (DAO); J. Fletcher, Regina, July 7, 1904 (DAO); W. Shevkenek, Hungry Hollow, open woods, June 3, 1939 (DAO).

ALBERTA: J. Macoun 2954, Medicine Hat, Seven Persons Coulee (CAN); W.

Spreadborough 19210, Crossing of Pembina River (CAN); H. M. Raup 2441, Pine Lake District (CAN); H. M. Raup 2435a, Waterways (CAN); N. B. Sanson, Midnapore (CAN); H. M. Raup 2437, Peace Point (CAN).

NORTH WEST TERRITORIES: C. H. Crickmay 47, Liard River between Nahanni Butte and Simpson (Can).

BRITISH COLUMBIA: Raup & Abbe 3607, vicinity of Hudson Hope (CAN).

The specimens from the James Bay area heretofore referred *T. confine* Fern. might perhaps be better placed with *T. Turneri* although this material still remains somewhat puzzling.

This new species is named after Dr. G. H. Turner, an amateur botanist who has acquired an unequalled field knowledge of the flora of the neighborhood of Edmonton. This species is easily distinguished from *Thalictrum venulosum* Trel. — a short plant, usually 2 to 5 dm. high, with small thick leaflets and growing in the open — by its stature, its elongated inflorescence with appressed branches, its unusually long internodes and peduncles, its longer filaments, its larger and thinner leaflets, and its narrower and longer fruit. Its foliage is somewhat similar to that of *T. occidentale* Gray var. *palousense* St. John, but the latter is nearly always puberulent, its inflorescence is exerted and usually simple or with one or two short branches at the base, its divaricated pedicels are inserted in 2's or 3's and, of course, the fruit is much different from that of *T. Turneri*.

To the aforementioned collections may be added the following numbers, all collected in 1947 near Fort Saskatchewan by Dr. Turner himself: 5508, 5515, 5534, 5535, 5540, 5546, 5551, 5557, 5558, 5560, 5599, 5603, 5664,

¹ Received for publication Oct. 8, 1948.

² Contribution No. 962 from the Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Canada.

5668, 5716, 5719, 5719a, 5729, 5730, 5732, 5746, 5747, 5761, 5770, 5795, 5800, 5825, 5848, 5892. These numerous and interesting collections are the result of a suggestion to Dr. Turner that *T. Turneri* should be carefully studied in the field to ascertain whether it was a distinct entity or a mere ecologically induced variation of *T. venulosum* Trel., a species normally growing in open places.

And indeed the copious annotations on the labels record for *T. Turneri* such habitats as: edge of woods, river flats near wooded area, aspen woods, poplar woods, among roses and other small shrubs at edge of chokecherry thicket, ground from which poplar wood was cut in 1946 and the ground broken roadside a few feet from aspen woods, wooded river flats, edge of pond in shade of poplars, open roadside formerly wooded, ditch (formerly wooded), shade of mixed poplar and spruce trees, etc. Despite this variety of habitats, the characters of *T. Turneri* seem to remain constant. All *T. venulosum* specimens are recorded as having been collected in open places, prairies, etc., never in woods.

This extensive series of *T. Turneri* also shows that its flowering season around Fort Saskatchewan ranges from May 30th to July 3rd, while the accompanying sheets of *T. venulosum* from the same area indicate that the latter species starts flowering two weeks earlier.

The recognition of *T. Turneri* as a distinct species clarifies the status of two entities I had previously called var. *columbianum* and var. *Greeneanum* of *T. confine*. With the transfer to *T. Turneri* of a few puzzling specimens previously placed with var. *columbianum*, it now seems more appropriate to name as follows the two aforementioned varieties:

THALICTRUM FISSUM Greene, Pittonia 4:233-4. 1901.

Syn.: *T. columbianum* Rydberg, Bull. Torr. Club 39:320. 1912.

T. confine Trel. var. *columbianum* (Rydberg) Boivin, Rhodora 46:442-3. 1944

T. occidentale Gray var. *columbianum* (Rydberg) St. John, Fl. South. Wash. Adj. Id. 156. 1937.

THALICTRUM FISSUM Greene var.

Greeneanum stat. n.

Syn.: *T. confine* Fernald var. *Greeneanum* Boivin, Rhodora 46:442. 1944.

THALICTRUM BREITUNGII sp. n. subsectionis *Laminariorum*, sed affinis et *Thalictrum Fendleri* Engelman et *T. occidentale* Gray var. *palousensi* St. John.

Planta glabra 30-70 cm. Frons sicut *Thalictri occidentalis* var. *palousensis* nisi foliis maris modo lobis angustioribus et sinis profundioribus. Inflorescentia maris 3-15 dm. long., si parva racemosa sed si amplior paniculata. Inflorescentia foemineae 15-30 cm. angustissime paniculata ramis valde ascendentibus. Pedunculi maris (1.0)-1.5-(2.0) cm. ascendentes, postea anthesi paullum recurvati, 1-2-(3) in nodo. Pedunculi foeminae (0.5)-1.0-(1.5) cm. ascendentes incurvati, (1)-2-3-(4) in nodo. Tepala maris ca 3 mm. long. ovata, purpurea, summa erosa. Tepala foemineae ca 2 mm., elliptica. Filamenta 4-5 mm. purpurea. Antherae 2-4 mm., luteae, acumine millimetrali vel brevior. Ovaria glabra. Stigma ca 2 mm. aciculare. Carpella matura nunquam reflexa sed valde compressa ut crassitudo a dimidiis latitudinis recedit, ventro 4 mm. long., 2.5 mm. lat., ovato, nervo dorsali convexiore quam ventrali. Floret junio julioque. Habitat in Alaska et Yukon.

YUKON: A. E. Porsild & A. J. Breitung 10-896, Canol Road, Rose-Lapie River Pass, mile 105, schist mountain east of lake. Elev. 4000-6000', 1944 (CAN typus et 9 isotypi distribuendi); C. H. D. Clarke, Haines Road, mile 85, 1946 (CAN).

ALASKA: J. P. Anderson 5631, Hyder, July 5, 1939 (CAN).

All the aforementioned specimens are at the National Herbarium of Canada in Ottawa. This species is clearly intermediate between the sections *Laminaria* and *Compressa*. It is related to both *Thalictrum Fendleri* and the variety *palousense* of *T. occidentale*. Specimens cited above are the only ones collected up to now in Yukon and Alaska for the subgenus *Lecoyerium*.

This new species may be separated from *T. Fendleri* Engelman by its purple filaments, the lack of pubescence and stipellules, and by its fruit more convex dorsally than ventrally. From the numerous varieties of *T. occidentale* Gray, it is distinguishable because of its very short stigmas, its much

more deeply lobed leaflets, the lobes being narrower and usually acute, and especially because of its shorter peduncles and its flattened ascending fruit.

This new species is named after August Julius Breitung, a young amateur botanist of outstanding ability who accompanied A.

E. Porsild to the Yukon in 1944 and is now on the staff of the Division of Botany and Plant Pathology, Ottawa.

Herbarium abbreviations

CAN... Victoria Memorial Museum (National Herbarium), Ottawa.

DAO... Department of Agriculture, Ottawa.

KEY TO CANADIAN SPECIES OF THALICTRA

IN ANSWER to many requests, I am proposing this new artificial key to the Canadian species and varieties of the genus *Thalictrum*. The Canadian distributions are also indicated.

- a. Inflorescence simple of alternating pedicels. Stem leaves none, or rarely solitary. Flowers perfect, tepals 5, stigmas triangular, included. QUEBEC (Gaspé and Saguenay) and YUKON *T. alpinum* L. var. *typicum* Boivin
- aa. Inflorescence compound or, if simple, with most pedicels in 2's or 3's. Stem leafy.
 - b. All the pedicels subtended by a small but compound leaf-like bracts. Flowers perfect, tepals 5, stigmas included.
 - c. Ovaries and fruits straw coloured to very light green. SASKATCHEWAN, ALBERTA, BRITISH COLUMBIA and YUKON *T. sparsiflorum* Turcz. var. *Richardsonii* (Gray) Boivin
 - cc. Ovaries and fruits of a deeper green colour than the leaves. ONTARIO *T. sparsiflorum* Turcz. var. *viridius* Boivin
 - bb. Most or all of the pedicels bractless or in the axis of minute simple bracts. Flowers dioecious or polygamous, tepals 4 or rarely more, stigmas exerted.
- d. Leaflets (0)-3-(5) lobed, the lobes entire. Filaments white.
 - e. Underside of leaves densely covered with capitate glands. ONTARIO and perhaps QUEBEC (Percé) *T. revolutum* D.C.
 - ee. Underside of leaves glabrous or covered with flexuous hairs, hairs not capitate.
 - f. Inflorescence narrowly pyramidal and acute at tip. Anthers 1.8-3.2 mm. long. oblong-lanceolate. Filaments weak
 - g. Leaves coriaceous, at least the upper one pubescent under. Anthers 1.8-2.2 mm. Stigma 2-3 mm. Receptacle at the centre of the head of fruits, some of the fruits being reflexed. ONTARIO, MANITOBA, SASKATCHEWAN, ALBERTA *T. dasycarpum* Fischer & Lall.
 - gg. Leaves membranaceous often glabrous and usually larger. Anthers 2.3-3.2 mm. Stigma 2.5-5.0 mm. Receptacle at the base of the head of the usually lanceolate fruits. BRITISH COLUMBIA, ALBERTA *T. dasycarpum* Fischer & Lall. var. *hypoglaucom* (Rydberg) Boivin
 - ff. Inflorescence broadly pyramidal or subcorymbose, always rounded at tip. Anthers ovate-oblong to oblong, less than 1.5 mm. long. Filament rigid and conspicuously clavate. Receptacle at the base of the head of fruits.
 - h. Inflorescence paniculate. Peduncles thin. Filaments 3.5 to 5.0 mm. long. Anthers about 1.0 mm. long. Stigma 0.5-2.0 mm. Carpels ovate to lanceolate. NOVA SCOTIA, PRINCE EDWARD ISLAND, NEW BRUNSWICK, QUEBEC, ONTARIO *T. polygamum* Muhl.

hh. Inflorescence subcorymbose. Peduncles thick. Filaments 5.0-8.0 mm. Anthers ca 1.2 mm. Stigma 1.5-3.5 mm. Carpels usually oblanceolate. NOVA SCOTIA, PRINCE EDWARD ISLAND, NEW BRUNSWICK, QUEBEC, ONTARIO *T. polygamum* Muhl. var. *hebecarpum* Fernald

dd. Leaflets with 3-5 most of the lobes being crenate. Filaments coloured, usually more or less purplish, but often yellow.

i. Stem leaf 1 or none. Inflorescence leaves numerous, the lower one with a petiole 2-8 cm. long. lant glabrous. QUEBEC, ONTARIO *T. dioicum* L.

ii. Steam with 1 or more leaves, lower inflorescence leaf sessile or with a short petiole less than 3 cm. long.

j. Peduncles all of nearly the same size, the longest less than twice the length of the shortest. Filaments of the anthers 5 mm. long. or more. Stigma 3 mm. long. or more.

k. Inflorescence (5)-10-(20) cm. long. Fruit strongly reflexed with body ovate and 4-7 mm. long. ALBERTA, BRITISH COLUMBIA
.....*T. occidentale* Gray var. *palousense* St. John

kk. Inflorescence 20-50 cm. long. Fruit with body lanceolate. BRITISH COLUMBIA *T. occidentale* Gray var. *Macounii* Boivin

jj. Peduncles varying greatly in size, the longest being at least twice as long as the shortest. Filaments of the anthers 5 mm. long. or less, stigma less than 3 mm. long. (except in *T. confine*).

l. Stigma (2.0)-2.5-4.0-(5.0) mm. long.

m. Fruit not compressed, ovoid. NEW BRUNSWICK, QUEBEC, ONTARIO *T. confine* Fernald

mm. Fruit slightly compressed, oblong to broadly lanceolate. BRITISH COLUMBIA *T. fissum* Greene

ll. Stigma very rarely more than 2 mm. long.

n. Peduncles elongate, averaging 2-3 cm., and about 3 to 5 per node. Fruit not compressed but 4.0-4.5 mm. long and slightly incurved at the tip. MANITOBA, SASKATCHEWAN, ALBERTA, BRITISH COLUMBIA *T. Turneri* Boivin

nn. Peduncles averaging less than 2 cm. in length and generally 2 per node.

o. Fruit much compressed, at least twice broader than thick. YUKON *T. Breitungii* Boivin

oo. Fruit not compressed. QUEBEC, ONTARIO, MANITOBA, SASKATCHEWAN, ALBERTA, BRITISH COLUMBIA *T. venulosum* Trelease



NOTES ON GRAND MANAN BIRDS¹

JAMES BOND

The Academy of Natural Sciences, Philadelphia, Pa.

The following notes will supplement the information contained in Pettingill's "The Bird Life of the Grand Manan Archipelago" (Proc. Nov. Scot. Inst. Sci., vol. 19, pt. 4, 1939, pp. 293-372). Mr. Pettingill listed 74 species known to nest, or to have nested, on Grand Manan. Subsequently I added 12 (Can. Field-Nat., vol. 55, 1941, pp. 34-35) and now, in this paper, three more, making a total of 89. It will be very difficult to add to this number, although there are approximately 100 species that breed regularly in the Archipelago.

Pettingill lists 275 birds known to inhabit, or to occur at, Grand Manan, and following his comprehensive publication two more species were obtained here — the Tennessee Warbler and the Yellow-breasted Chat. In view of the occurrence of the western race of the later warbler in Massachusetts, I carefully examined the Grand Manan specimen (now in Mr. Allan Moses' collection at North Head) and can say that it is definitely the eastern race.

When on Kent Island in the summer of 1945, Mr. Ernest Joy informed me of the occurrence of the Least Tern there following the hurricane of the previous year, a storm that also carried north many Black Skimmers. The only other record of the Least Tern is that of George Boardman, considered hypothetical by Pettingill.

Grand Manan is now one of the best known localities ornithologically in eastern North America, and several birds recorded from the Archipelago are as yet unknown from the mainland of New Brunswick.

I wish to thank Mr. and Mrs. George Boyer of Woodstock, N.B., who resided on the island during the summer of 1946, for permission to use their notes on certain species. Both are ardent and capable observers and delightful companions in the field. I am also indebted to my friend Mr. C. Chandler Ross of Philadelphia, who has kindly given me the daily records of birds that he prepared so assiduously during our sojourns together on Grand Manan.

BLACK-CROWNED NIGHT HERON (*Nycticorax nycticorax hoactli*). — Several nests with young found in northern part of Long Island in late June, 1946. The species also nests on Nantucket Island.

GREEN-WINGED TEAL (*Anas carolinensis*). — Two pairs of this teal nested at the Sanctuary (Great Pond) in 1948. A brood of five ducklings was observed by Mr. Boyer on June 24, another of nine by Mr. Boyer and me on June 25. No Blue-winged Teal were seen on the island in 1948.

AMERICAN EIDER (*Somateria mollissima dresseri*). — This eider no longer nests on Outer Wood Island, although I found three nests on Whitehorse Ledge on June 21, 1948. I had been told that Double-crested Cormorants nest on this ledge, but there was none there this year, and I do not believe that the species breeds anywhere in the Archipelago at present.

RED-TAILED HAWK (*Buteo jamaicensis borealis*). — I observed an individual on July 4 1946, near Eel Lake. The species had been noted here previously by Mr. Ralph Griffin, the game warden. I recently found the Red-tail nesting on Mt. Desert Island, Maine. Thus it may well be a very rare, or at least an occasional, summer resident on Grand Manan. BROAD-WINGED HAWK (*Buteo platypterus platypterus*). — This hawk has greatly increased in numbers on Grand Manan during the past ten years, and is now a rather common summer resident.

OSPREY (*Pandion haliaetus carolinensis*). — Now a rare summer resident on Grand Manan. I have seen the species on only four occasions. DUCK HAWK (*Falco peregrinus anatum*). — One was seen by Mr. Ross and me at the cliffs known as "Seven Days' Work" on June 20, 1948. It appeared much upset at our presence and probably had young nearby.

PIGEON HAWK (*Falco columbarius columbarius*). — Mr. Ross and I observed an individual west of Castalia on June 21, 1945, another at Grand Harbour on June 25, 1948. I have noted this species on the mainland of Washington and Hancock Counties (Maine) in early summer.

¹) Received for publication August 2, 1947.

SPARROW HAWK (*Falco sparverius sparverius*). — Mr. George Boyer showed me a nest of this species, that evidently contained young, on June 29, 1946. It was located in a cavity of a dead tree in a clearing near the Dark Harbour Road. Both parents were present and were much excited when we approached the nesting site. I had not previously seen the Sparrow Hawk on Grand Manan.

GREAT BLACK-BACKED GULL (*Larus marinus*). — This gull is much less numerous in the vicinity of Grand Manan than among the outer islands of eastern Maine. Its relative scarcity has to a great extent enabled the Eider Ducks to increase in numbers.

BELTED KINGFISHER (*Megasceryle alcyon alcyon*). — Rare on Grand Manan. An occupied nesting burrow was found by Mr. Ross between North Head and Castalia in late June, 1946.

KINGBIRD (*Tyrannus tyrannus*). — In my experience a rare bird on Grand Manan and other islands off the coast of eastern Maine.

OLIVE-SIDED FLYCATCHER (*Nuttallornis borealis*). — Unquestionably a summer resident, although rare. Noted as late as July 4.

BANK SWALLOW (*Riparia riparia riparia*). — In 1945 a pair nested near North Head, and there were three occupied nesting burrows here in 1946.

ACADIAN CHICKADEE (*Parus hudsonicus littoralis*). — This little brown-capped chickadee is common on Grand Manan, far more so than anywhere in the State of Maine, and is one of the most interesting of the land birds to the visiting ornithologist. Mrs. George Boyer showed me a nest that she found in the rotted centre of a fence post about two feet above the ground, alongside the main road near the mouth of Dock Brook. On July 5 (1946) the nest contained five newly hatched young. When I peered into the cavity the brooding bird frequently uttered a harsh hissing, reminiscent of a grey squirrel and surprisingly loud.

CATBIRD (*Dumetella carolinensis*). — A nest was found by Mrs. George Boyer alongside her cottage near Castalia. The birds began to build on June 9 (1946). On June 17 the nest contained four eggs. These hatched on June 29.

HERMIT THRUSH (*Hylocichla guttata faxoni*). — Although the Olive-backed Thrush is

abundant on Grand Manan, the Hermit Thrush is quite rare as a summer resident and is apparently absent from the outer islands.

GOLDEN-CROWNED KINGLET (*Regulus satrapa satrapa*). — On July 4, 1946 I found a nest with young situated about 20 feet above the ground in a spruce near the mouth of Eel Brook.

RUBY-CROWNED KINGLET (*Regulus calendula calendula*). — Usually a rather rare but widespread summer resident on Grand Manan, but fluctuates in numbers from year to year.

SOLITARY VIREO (*Vireo solitarius solitarius*). — A rare, but undoubtedly a regular, summer resident. I have almost always found this species at some point along the Dark Harbour Road.

PARULA WARBLER (*Compothlypis americana pusilla*). — Another rare but regular summer resident on Grand Manan.

CHESTNUT-SIDED WARBLER (*Dendroica pensylvanica*). — This warbler has evidently increased in numbers in recent years and is now a not uncommon summer resident on the island. A nest was found by Mr. Boyer on a hillside west of Dock Brook. This contained three newly hatched young on June 26, 1946.

BLACK POLL WARBLER (*Dendroica striata*). — Nests in eastern Grand Manan (from woods near Bancroft Point to Long Pond) and on the outer wooded islands (e.g. Long, Nantucket, Ross, Whitehead, Kent, Hay). On the mainland of New Brunswick I doubt if this warbler nests anywhere but on the higher western mountains, although the species may breed at approximately sea-level in the Campbellton region. Breeding records from Northumberland County (Philipp and Bowdish Auk, 1917, p. 271) I consider questionable. Individuals seen near Tabusintac in mid-June were probably late transients.

YELLOW PALM WARBLER (*Dendroica palmarum hypochrysea*). — An individual in full song was seen on June 22, 1945, by Mr. Ross and me in a bush-covered bog just south of Castalia and west of the main highway. This constitutes the first summering record of this species on Grand Manan.

NORTHERN WATER-THRUSH (*Seiurus noveboracensis noveboracensis*). — I do not believe that this species breeds on Grand Manan. In the first place there is no very suit-

able habitat. Secondly, the species is merely casual in summer on any of the Maine islands. WILSON'S WARBLER (*Wilsonia pusilla pusilla*). — An individual in full song was seen at close range south of Seal Cove on June 20, 1948.

CANADA WARBLER (*Wilsonia canadensis*). — One seen by Mr. Boyer and me near Dark Harbour Brook on July 1, 1946. Another new summering record.

BOBOLINK (*Dolichonyx oryzivorus*). — Seen feeding young in a field near Whale Cove Swamp in early July, 1945. The following year (June 19, 1946) I flushed a female from her nest that contained five eggs in the same field. Apparently the first nest record of the Bobolink for Grand Manan.

RED-WINGED BLACKBIRD (*Agelaius phoeniceus phoeniceus*). — Mrs. George Boyer showed me a nest of this species that she had found in the cat-tail marsh at Whale Cove. When first discovered (June 8, 1946) the nest contained four eggs, but these were

later taken by some predator. The only other locality on Grand Manan where I have seen the Red-wing is at the Sanctuary (Great Pond).

BALTIMORE ORIOLE (*Icterus galbula*). — A male appeared at North Head on June 15, 1946 and remained until June 22. During this period it was seen or heard every day, but apparently was unable to find a mate and deserted the locality on the latter date. PURPLE FINCH (*Carpodacus purpureus purpureus*). — During my visits to Grand Manan both this finch and the Pine Siskin have been rare.

WHITE-WINGED CROSSBILL (*Loxia leucoptera leucoptera*). — I have frequently noted this species on Grand Manan and on other islands off the coast of Maine, although it is not a common bird in this region. On the other hand, I have never seen the Red Crossbill on the island, nor anywhere in eastern Maine.

RANGE EXTENSIONS FOR THREE GRASSES IN WESTERN CANADA¹

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Studies of the extensive grasslands of southern Saskatchewan and Alberta continue to reveal species not previously reported for these areas. The authors and their associates of the Grassland Research Laboratory, Dominion Experimental Station, Swift Current, Sask., have found half a dozen such species during the past few seasons. A note regarding the plants of other than the grass family has been published recently (Tisdale and Budd, 1948). The grasses are as follows: *Calamagrostis rubescens* Buckl., *Hordeum nodosum* L., and *Munroa squarrosa* (Nutt.) Torr. Specimens of all three have been placed in the Station herbarium and duplicates sent to the herbaria of the Division of Botany, Science Service, Ottawa, and of the University of Saskatchewan, Saskatoon, Sask.

Calamagrostis rubescens (Coll. No. 44-82) was collected in Cypress Park, 20 miles south

of Maple Creek, Sask., in August, 1944, by the senior author and R. T. Coupland. The location was Section 30, Township 8, Range 26, West of the Third Meridian, at an altitude of approximately 3900 feet. The species was found to be common at this site and in adjacent parts of the Park, under stands of *Pinus contorta* var. *latifolia*. This grass was collected in 1935 by J. L. Bolton, then a member of the Station staff, in the Alberta section of the Cypress Hills, some 40 miles west of the present site. Apparently *Calamagrostis rubescens* is fairly common throughout that portion of the Cypress Hills occupied by lodgepole pine forest. The range of this grass is given by Hitchcock (1935) as "Manitoba to British Columbia south to Northern Colorado and Central California."

This reported range appears to be in error so far as its eastern limits in Canada are concerned. Considerable investigation

¹ Received for publication April 15, 1947.

has failed to reveal the existence of any specimens of *C. rubescens*, other than those noted above, from any point east of the Rocky Mountain Foothills. In Western Canada, the collections are all from British Columbia and the Alberta Foothill region. The report of the species for Southern Manitoba by Lowe (1943) was based apparently on the range given in Hitchcock, not on collections. In Montana, *C. rubescens* is confined to the Western part of the State, and it has not been reported from either North or South Dakota.

The collections reported here, by Bolton from Southeastern Alberta and ourselves from Southwestern Saskatchewan, apparently represent considerable extension of the known range of this grass. No doubt *C. rubescens* may be considered as another of the many species of Rocky Mountain affinity which are found in the Cypress Hills. It is interesting that this grass has not been reported from the Black Hills of South Dakota, which like the Cypress Hills, constitute an eastern outpost for many Rocky Mountain plants.

Hordeum nodosum (Coll. No. 44-107) was found in Cypress Hills Park in July, 1944, by the junior author. The site was a fairly moist, narrow valley bottom on Section 17, Township 8, Range 26, West of the Third Meridian, at an altitude of about 3800 feet above sea level. The plant is fairly common in this one locality, but to date has not been observed elsewhere in the vicinity. Associated species included *Danthonia californica* var. *americana*, *Bromus ciliatus* and *Agropyron trachycaulum*. Hitchcock (1935) gives the range of *Hordeum nodosum* as "Montana to Alaska, south to New Mexico and California". It is reported as common in Montana, but has not been found in North or South Dakota nor in Manitoba.

Only two collections from Alberta are known to the authors. One of these is from the Livingstone Valley in the Rocky Mountain Foothills, the other from Elkwater Lake in the Cypress Hills.

The latter collection was made by the senior author in 1932, in a grassy meadow at an altitude of about 3800 feet above sea level. *H. nodosum* was fairly common on the site (Section 24, Township 8, Range 3, West of the Fourth Meridian), which is nearly 40

miles west of the location of the present Saskatchewan collection. It would appear that these two collections from the Cypress Hills extend the known range of *H. nodosum* in Canada some 200 miles eastward. *H. nodosum* bears a superficial resemblance to the more widely distributed *Hordeum jubatum* var. *caespitosum* and may sometimes escape notice for this reason.

Munroa squarrosa (Coll. No. 46-212) was found at Brunyee's Ranch in the valley of the South Saskatchewan River in July, 1946 by J. B. Campbell, W. A. Hubbard and T. Willis. The site was on Section 28, Township 19, Range 15, West of the Third Meridian. Only one small patch was found growing on a garden path where it had endured much trampling. According to the ranch owner, the grass has been present at the site for many years. Since it is an annual, this indicates that conditions have been sufficiently favorable for the production of viable seed. Despite this, there was no sign of it having spread into the surrounding native sod of *Bouteloua gracilis* and *Stipa comata*. There is no information available as to the possible source of seed for the colony. The range of *Munroa* is given by Hitchcock (1935) as "Alberta and North Dakota to Montana and south to Texas and Arizona". Apparently it has been collected only a few times in Alberta, the localities including Medicine Hat, Hardisty, and Red Deer. In North Dakota it is confined to the southwest corner of the State, while the occurrence in Montana is mainly in the western part where it is common. There is no record of this grass for Manitoba.

The authors wish to acknowledge the assistance of Professors E. H. Moss, University of Alberta, Edmonton; C. W. Lowe, University of Manitoba, Winnipeg; W. E. Booth, Montana State College, Bozeman, Montana; O. A. Stevens, North Dakota Agricultural College, Fargo, N.D.; W. H. Over, University of South Dakota, Vermillion, S.D., and W. L. Miller, South Dakota State College, Brookings, S.D., in supplying data regarding the occurrence of these grasses in their respective regions. Dr. H. A. Senn, Division of Botany, Science Service, Ottawa, kindly checked the identifications and provided data on material in the Herbarium of the Division of Botany. Information on ma-

terial of *Calamagrostis rubescens* in the United States National Herbarium, Washington, D.C., was given by Jason A. Swallen. Dr. H. J. Hermann supplied similar data from the National Arboretum Herbarium Beltsville, Maryland.

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DISTRIBUTIONAL NOTES ON CANADIAN BIRDS ¹

A. L. RAND

National Museum of Canada, Ottawa.

IN THE COURSE of working over the collection of the National Museum of Canada, and through correspondence with various bird students, a considerable number of data on the distribution of Canadian birds have been brought together. It seems advisable to publish this sort of material periodically so that it will be available to other students.

Fulmarus glacialis glacialis (Linnaeus).

ATLANTIC FULMAR. — A specimen in the National Museum, collected July 27, 1916, by G. Bernard at Cape Kellet, Banks Island, Northwest Territories, seems to be a western record for this subspecies. This specimen, (sex?) in pale phase of plumage, compares well with many eastern birds *glacialis* in color, and in the greater extent of black in the bill. In this latter character it differs sharply from a series of western *rodgersii*.

Though Armstrong recorded the "Fulmar Petrel" near Nelson's Head, Baring Land (= Banks Island) on September 7, 1850, (A Personal Narrative of the Discovery of the North-west Passage, 1857, p. 213) and Preble noted this, (No. Amer. Fauna, No. 27, p. 274), the range usually given is west to Melville Island only.

Branta leucopsis (Bechstein).

BARNACLE GOOSE. — On April 5, 1944, Thomas Mark handled a barnacle goose that had been killed at Factory River, about 30 miles north of East Main, James Bay, Quebec. The information sent to the National Museum

by James Mark of East Main included the following description, "About the size of a blue goose or slightly larger, breast and neck entirely black, also top part of the head was black, white cheeks and white forehead, a little black stripe from the eye to the bill. White belly, bill same color as brant; feet are of greyish color. Goose was flying with two Canada Geese — coming from the south. Its wing beats were faster than those of Canada's, — its call was altogether different." Mr. Mark, using Taverner's "Birds of Canada", identified it as a barnacle goose. From the above description the bird must have been one.

The possibility that it was an aberrant Canada goose is remote, as the following year James Mark did take an aberrant Canada goose with markings resembling those of barnacle goose, and submitted the head and photographs of the bird for identification as he was unable to recognize it.

The barnacle goose is only a casual visitor to the North American continent and it is interesting to note that there is another record for James Bay, of a specimen taken near Rupert House by Ross that is said to be the first record for the American continent, (Baird, Brewer and Ridgway, 1884, Water Birds of North America, 1, p. 475).

Phalaenoptilus nuttallii nuttallii (Audubon).

NUTTALL POOR-WILL. — Hitherto the records of this species in Canada east of British Columbia, have not been supported by specimens. The taking of a specimen in

¹ Received for publication May 22, 1947.

the Cypress Hills, Alberta, on June 29, 1945, by A. L. Rand and H. Clemens adds this species to the list of birds known from Alberta. Another of this species was heard calling from the edge of the forest and shrubby grassland on top of the Cypress Hills south of Elkwater. It is possibly of more than casual occurrence.

Megaceryle alcyon alcyon (Linnaeus).

EASTERN BELTED KINGFISHER. — Specimens recently received from Teslin and Sheldon Lakes, Lapie River, Yukon, (wing, (chord), male adult, 158; female adult, 160; male immature, 161, female immature, 162) northeast British Columbia (Liard River, female immature, 160 mm.) indicate that northeast British Columbia and Yukon should be considered in the range of this subspecies.

The southern summering localities represented in our collection from Alberta are Banff, and the Red Deer River (wing, male adult, 157; male immature, 155; female immature 155 mm.).

Megaceryle alcyon caurina (Grinnell).

WESTERN BELTED KINGFISHER. — Two specimens from extreme southwest Alberta, (Waterton Lakes, female immature, wing 166, and near Macleod, female adult, wing 169) indicate the summer range of this subspecies

must be extended to include this area. Though *M. a. alcyon* summers on the Red Deer River (see measurements above) a single fall specimen from there (September 19) is an immature female with a wing of 165 mm., suggesting that this form may wander that far north in the fall.

Dryobates villosus septentrionalis (Nuttall).

NORTHERN HAIRY WOODPECKER. — The two subspecies *D. v. septentrionalis* and *D. v. villosus* are separable chiefly on size; Ridgway (1914, Bull. 50, U. S. Nat. Mus., pt. 6, p. 201) gives the wing measurements of *septentrionalis* as ♂ 128-138; ♀ 128-136.5; and *villosus* as ♂ 114.5-124; ♀ 115-128. A survey of the material in the National Museum supports the view that about 126 mm. wing length is the best line of division between the two forms. However this necessitates some adjustments in the limits of the accepted range of *D. v. villosus* as extending to Manitoba. However our material indicates that all Manitoba is best considered as occupied by *septentrionalis* and that *villosus* does not extend continuously westward in Canada beyond southeast Ontario, with an intrusion from the south into extreme southwestern Ontario, in the Rainy River area as the measurements in Table 1 show.

Table 1. — *D. v. septentrionalis*

| | ♂ ad. | ♀ ad. |
|----------------------|-------------------------|---------------|
| Manitoba (south) | | |
| Turtle Mt. | 128 | — |
| Oak Lake | — | 128, 129 |
| Riding Mt. | 128, 128 | 127, 130 |
| Shoal Lake | 126, 127, 128, 131, 131 | 126, 128 |
| Duck Mt. and Garland | 128 | 130 |
| Swan River | 126 | — |
| Lake Winnipegosis | 133 | — |
| Manitoba (north) | | |
| The Pas and north | 132 | 126, 127, 130 |
| Ontario (west) | | |
| Lac Seul | 130, 131 | — |

For comparison the measurements of our Alberta series, undoubtedly referable to this form, is as follows, ♂ ad. (11) 126-138, (av. 130.5); ♀ ad. (10), 127-132, (av. 129.2).

Dryobates villosus villosus (Linnaeus).

EASTERN HAIRY WOODPECKER. — The 1931 A.O.U. Check-list gives the range of this subspecies as extending to Manitoba. Above

I have shown all Manitoba to be occupied by *D. v. septentrionalis*. The present subspecies, *villosus*, reaches its northwest limit in Canada in southeastern Ontario, near Ottawa, and Georgian Bay, intergrading with the next form in central Ontario, and with an intrusion from the south into extreme southwest Ontario (Rainy River), as the measurements in Table 2 show.

Table 2. — *D. v. villosus*

| | ♂ ad. | ♀ ad. |
|------------------------------------------------|--------------------|--------------------|
| Ontario | | |
| south of Ottawa and Georgian Bay | 124, 127 | 118, 119, 119, 121 |
| Ottawa | 124, 125, 125, 125 | 122, 125, 125, 125 |
| Georgian Bay | 124, 127 | 121, 126 |
| Rainy River ^a | — | 122.5 ^a |
| <i>D. v. villosus</i> — <i>septentrionalis</i> | | |
| Central Ontario | | |
| Algonquin Park | 127 | — |
| Algoma District | 130 | 124 |
| Kapusking | 126, 130 | 118, 124, 128, 128 |

***Dryobates villosus monticola* Anthony.**

ROCKY MOUNTAIN HAIRY WOODPECKER. — The range of this subspecies, usually given as central British Columbia southward must be extended to include extreme southwestern Alberta.

In the National Museum we have four specimens as follows: Waterton Lakes, May 22, 1922, May 12, Aug. 20, 1923, (C. H. Young) and Canmore, May 29, 1891. (W. Spreadborough). These compare well with southern British Columbia specimens in the reduction of white in the upper wing coverts, and show no approach to *septentrionalis*.

The area occupied by *monticola* in Alberta must be small, as we have well marked *septentrionalis* from the Cypress Hills, Milk River, Red Deer River, and Jasper.

***Dryobates pubescens leucurus* (Hartlaub).**

BATCHELDER DOWNY WOODPECKER. — British Columbia, but not Alberta is included in the range of this subspecies. Three specimens in the National Museum, an adult male, May 22, 1922, and an immature male and female July 28, 1945, from Waterton Lakes Park in extreme southwest Alberta are referable to this subspecies on the basis of the reduction of white in the upper wing coverts. In this they compare much better with south British Columbia specimens than they do with other Alberta specimens, or with those from farther east in Canada.

This extends the range to extreme southwest Alberta, but it must be of very limited extent there, as summer specimens from Banff, Red Deer River, Medicine Hat, and Cypress Hills have much white in the upper wing coverts and are referable to *medianus*.

^a) Measurements from Synder, L.L., 1938, Trans. Roy. Can. Inst., 22, p. 193.

***Empidonax minimus* (Baird and Baird).**

LEAST FLYCATCHER. — The least flycatcher's range has been extended to north-eastern British Columbia in the Peace River area by Cowan. (1939, Occ. Papers British Columbia Prov. Mus., No. 1, p. 38) and Clarke has provided sight records of the species north along the Alaska Highway to Watson Lake in southern Yukon (1945, Can. Field-Nat. 59, p. 65). An additional farther west British Columbia station is represented by a specimen from Telkwa, British Columbia, a female taken Aug. 22, 1919, by W. Spreadborough. The specimen is in fresh fall plumage and measures, wing, 65; tail, 49.5; exposed culmen 8.5; tarsus, 15; middle toe, 8.2 mm. This seems to be the most western record of the species.

***Myiochanes virens* (Linnaeus).**

EASTERN WOOD PEWEE. — The normal range of this species does not extend beyond southern Quebec. Austin in his monograph "The Birds of Newfoundland and Labrador" (1932, Mem. Nuttall Ornith. Club, No. 7) does not mention the species.

It is interesting to record a stray individual off the Labrador coast collected by Mr. P. A. Taverner. He writes in his notes that on Aug. 31, 1929, in latitude 57, longitude 57, about 200 miles off the Labrador coast from Hopedale a wood pewee flew aboard and alighted on one of the derrick booms. It was obviously "all in" and crouched down as if exhausted. It was collected and on skinning it was found very dry, and Taverner presumed it was suffering from lack of water as well as fatigue.

The specimen, a male, is in very worn adult plumage.

***Pica pica hudsonia* (Sabine).**

AMERICAN MAGPIE. — In the Canadian Field-Naturalist, 59, p. 45, I gave data on the northern and eastern spread of the magpie, showing that it was uncommon but of regular occurrence as far northeast as the Herb Lake area of central west Manitoba, and giving North-west Territory records.

Additional data on the northeastern spread of the magpie in 1944-45 have come to hand. Through Mr. T. H. Manning I got in touch with Sgt. Stafford of the Royal Canadian Mounted Police, at Churchill, and asked him about the occurrence of magpies there. He writes on May 1, 1945, "It seems that magpies have made their appearance in this district for the first time during the past eighteen months or so. I was in the Nejaniline Lake district during the winter and the body of a magpie was brought to me by an old Indian who wanted to know what it was. The man had spent all his life in the country and had never seen one before, he reported that there were quite a number in the country and that they had arrived during the past year.

"One was also brought to me by a half breed trapper who had killed it about fifty miles West of Churchill, he stated that it was the only one he had seen and that he had never seen one before in his life.

"I am also advised by a trapper in the Cape Churchill district that there are quite a number of the birds there this year and that he had never seen any there before.

"Both these birds were brought to me during the winter by men who have spent all their lives hunting and trapping in this district, they know that I am interested in birds and brought them to me to find out what they were. It would therefore seem safe to assume that magpies have never been in this country until recently."

That this northwestern influx of magpies extended farther eastward and reached western Quebec is indicated by data from Mr. James Mark, Eastmain, James Bay, Quebec, who sent a fragmentary magpie specimen to the National Museum with the information that it was caught in a fox trap in November, 1944, by Albert Gilpin, an Indian trapper. Indians, even old men, told Mr. Mark that they had never seen one before.

Though there are a few records of magpies in southwestern Quebec, in settled areas, some are definitely known to be escapees from

captivity, while the same can be suspected of the others. The present Quebec record, however, seems to be the result of the recent northeastern expansion of the bird, and is an undoubted natural occurrence in the province.

Mr. Sam Waller of The Pas, Manitoba, has sent to the National Museum data on the breeding of the magpie in northern Manitoba in 1946. A correspondent of his, Mr. Henry Hall, of Pikwitonie, mile 213, Hudson Bay Railway, under date of June 7, 1946, wrote that a pair of magpies were raising a family of six young in a clump of spruce in his yard. Mr. Hall writes that he has lived in this part of the country for twenty years and has never seen the species previously. The birds were first seen on February 14, 1946. The nest was built in late March and early April, and the eggs laid in April; later, after the young hatched and Mr. Hall climbed to the nest to examine them, the nest fell and the young were taken by a fox. The nest was collected and sent to Mr. Waller.

***Corvus brachyrhynchos* Brehm.**

CROW. — In northeastern British Columbia crows occur commonly about Dawson Creek and Fort St. John. In 1943 when on the Alaska Highway, I saw none farther north.

In 1944, on May 31, when at the garbage dumps near Trutch on the Minaker River, (mile 157, north of Fort St. John), there were at least 3 crows, identified by size and call, faster wing beat, and less wedge-shaped tail compared with the ravens that were also present.

The previous year I had spent the period July 12-17 at Trutch and though ravens were common, no crows were seen. Possibly this 1944 record actually represents a northward spread of the crow along the Alaska Highway where the construction camps with the plentiful supply of food provided by their garbage dumps have made the area more attractive to them.

***Turdus migratorius nigrideus* Aldrich and Nutt.**

BLACK-BACKED ROBIN. — Dr. O. H. Hewitt, on his return from his summer's work on the north shore of the Gulf of St. Lawrence for the National Parks Bureau donated to the National Museum two adult male robins taken at La Tabatiere, near Cape Mecatina, north shore of the Gulf of St. Lawrence, Canada, on June 21, 1946. Through

the kindness of Dr. H. C. Oberholser I have been able to compare them with Newfoundland specimens. One is very similar to a Newfoundland male available; the other is slightly paler but is darker than the average of *T. m. migratorius* and the two are best referred to *T. m. nigrideus*.

This subspecies, described in 1939 and accepted by the A.O.U. Check-list Committee in 1944 (Auk. 61, p. 457), has been recorded as the breeding form in Newfoundland, Labrador and west to Chimo (Aldrich, 1945, Auk. 62, pp. 310, 311), but its westward extension into Canada has not been worked out. The present record is thus a slight westward extension of the known breeding range. The next station westward from which we have specimens is the vicinity of Moisie Bay, and these specimens, summer males, apparently breeding, are definitely referable to *T. m. migratorius* being about as pale as the average of this form.

T. m. nigrideus undoubtedly occurs in the maritime provinces of Canada in migration, but records made on individual specimens must be accepted with reservation. In the large series of robins in the National Museum collection are specimens from Ontario (Lac Seul, ♂ adult, fall plumage, Sept. 25, 1919, and Kapuskasing, ♂ adult, June 25, 1919). Manitoba, (Clear Lake, ♂ adult, June 30, 1938), and Mackenzie District, (♂ adult, Mackenzie Delta, May 17, 1932), which in darkness of upperparts, with the black of crown extending down over back, in depth of colour of underparts, and in the restriction of white in the throat, compare well with a Newfoundland male available for comparison.

Other specimens agree with, or even surpass the Newfoundland bird in intensity of one or another of these characters, but the four listed above compare much better with the Newfoundland bird on the combination of these characters than they do with the average of the populations from which they come.

So long as we are dealing with populations at or near their breeding grounds such specimens present no difficulties. The Newfoundland robin, *T. m. nigrideus* is a good race, separated on average characters. That occasional specimens of *T. m. migratorius* from populations as far away from the range of *nigrideus* as the Mackenzie Delta are inseparable does not upset the fact there are good average differences.

But once the emphasis shifts from breeding populations to sorting out the identity of individuals on migration when two subspecies can be mixed, the difficulty becomes apparent. The Ontario, Manitoba, and Mackenzie specimens listed above are identified as dark examples of *T. m. migratorius*. If they were taken by themselves, out of the populations they represent, they could be identified as *nigrideus*. Taken in migration, on their wintering grounds, it is quite possible that they would be identified as *nigrideus*. As the identification is a quantitative factor, as well as a qualitative one, it may be well to list the size of the samples examined, with the number of *nigrideus*-like examples in each. However, it must be kept in mind that I have but a single Newfoundland male, and consequently do not know the range of variation in that population, and more of the western birds might fall within the range of variation of *nigrideus*.

| Table 3. — Specimens of <i>T. migratorius</i> examined. | Adult males similar to | Adult males paler than |
|------------------------------------------------------------|---------------------------|---------------------------|
| | Newfoundland male | Newfoundland male |
| Ontario | 2 | 15 |
| Manitoba | 1 | 15 |
| Mackenzie | 1 | 1 |

The above specimens are assumed to be breeding; the following is a case of known breeding. Mr. R. W. Tufts has sent for my examination a male robin taken June 13, 1943, at Wolfville, Nova Scotia. It was one

of a breeding pair. In coloration it is as dark as any *nigrideus* I have seen. If it were taken in the spring or fall it would have been unhesitatingly referred to *nigrideus* that migrates through Nova Scotia. But because

it was part of the breeding population of Nova Scotia robins that average *T. m. migratorius*, it must be called *migratorius*. To recognize such facts in faunal lists, it is well to add a line to the effect that occasional examples that are individual variants are inseparable from *nigrideus*.

***Sturnella magna magna* (Linnaeus).**

EASTERN MEADOWLARK. — This is a common species in southern Ontario and southwestern Quebec. Hitherto the occasional James Bay and Hudson Bay records of meadowlarks have been of the western species, *Sturnella neglecta*. But fragments of a specimen secured at East Main, James Bay, Quebec, November 17, 1946, and sent to the National Museum by Mr. James Mark represent an eastern meadowlark, *Sturnella magna magna* (Linnaeus). The feathers of the back are darker and richer brown, and the barring of wing and tail feathers tends to be confluent along the shaft, comparing much better with specimens of *magna* than of *neglecta*. Mr. Mark writes that this is the first time he has seen the species in the East Main area.

***Pheucticus ludovicianus* (Linnaeus).**

ROSE-BREASTED GROSBEEK. — On June 2, 1944, when motoring up the Alaska Highway on the way to Yukon Territory, I stopped at the "Tropical Valley" in the Liard Valley, near the Lower Liard crossing, to visit the Hot Springs.

An adult male rose-breasted grosbeak was seen, and watched through 6 x binoculars, as it sat up singing on the top of a dead stub in the tall poplar forest. This seems to be a northwestern record for the species.

For other British Columbia records see Munro and Cowan, 1947. A Review of the Bird Fauna of British Columbia, p. 206.

***Carpodacus cassinii* Baird.**

CASSIN PURPLE FINCH. — Extreme southwest Alberta must be added to the range of this species as C. H. Young, collecting in Waterton Lakes Park for the National Museum, found the species there in May 1922, collected two specimens on June 6, 1923, and A. L. Rand and H. Clemens collected two there on July 30, 1945.

***Calcarius pictus* (Swainson).**

SMITH LONGSPUR. — Brooks and Swarth (1925, Pacific Coast Avifauna, No. 17, p. 90), had but two records of this species for British Columbia, specimens taken at Boundary Pass in the extreme southeast; and Kispiox Valley, near Hazelton. (Cowan, 1939, Occ. Papers British Columbia Provincial Museum, No. 1, p. 62), has recorded the species in the Peace River Country, British Columbia.

In the National Museum is a specimen taken by Dr. C. H. D. Clarke on July 17, 1944, at mile 85, Haines Road, British Columbia. It is a female and on the back of the label is the information "one of a pair" and "large brood patch". This indicates that the species was breeding at this locality, the first breeding station in British Columbia.

In view of the paucity of British Columbia records, and the normal breeding range of the species on the tundra east of the Mackenzie River, one wonders if this breeding (probable) in northwest British Columbia is a normal one.



BOOK REVIEWS

An Introduction to Paleobotany. By Chester A. Arnold; 433 pp; 187 black and white illustrations; McGraw-Hill Book Company, Inc., 330 West 42nd St., New York 18, N. Y. Price, \$5.50.

Chester A. Arnold, Professor of Botany and Curator of Fossil Plants, University of Michigan, has published in the McGraw-Hill Publications an attractive book on the subject of Paleobotany. In emphasizing the purpose of the book, the author indicates the need for a "book intended to meet the needs of American students". It is in this light that his book is especially attractive and will make a major contribution to paleobotanical literature. The author does well in his introduction in selecting a modern system of classification for the plant kingdom as a basis for utilization in subsequent chapters. He scores a second time through the completeness of his treatment on "How Plants become Fossils" in devoting appropriate space (25 pages) to a subject which is a prerequisite for a student of modern paleobotany. In presenting the conspectus of plant groups demonstrating the picture of increase in complexity of organization among fossil plants, he merits further praise. From the pedagogical aspect, the portion representing the body of the text is admirably expressed. Factual matter is always pertinent, precise, adequate and in good sequence. Theory is appropriately confined but not limited in selection of viewpoints, which the reader is bound to find stimulating. The latter is true particularly in the last two chapters, "Fossil Plants and Environment", and "Paleobotanical Systematics".

It is hardly constructive to state a reviewer's opinion that Professor Arnold has omitted to emphasize in separate chapters the economic applications of the subject of paleobotany that are attracting attention these days. Perhaps the best place for this is in a second volume. The author has fulfilled his purpose and the book will be valued by botanist and geologist alike. — NORMAN W. RADFORTH.

Ferns and Fern Allies of New Hampshire. By Edith Scamman. *New Hampshire Academy of Sciences, Bull. 2*, pp. 1-97, 1947. With 18 plates of line drawings.

This attractive little manual provides keys to the 8 families, 23 genera and 94 species and varieties of ferns and fern allies native to New Hampshire. For each species and variety is given the pertinent synonymy, together with brief notes on general and local distribution as well as on the local history to the species.

Most species are illustrated by beautiful line drawings by Mr. Gordon Dillon and Dr. Shirley Gale Cross. Users of this little book may wish that references to illustrations had been given in the text under each species. At the end of the manual is a most useful bibliography, a botanical glossary and a list of authors' names.

"Ferns and Fern Allies of New Hampshire" will be welcomed not only by professional and lay students of the ferns of New Hampshire but by all those in need of a practical manual to the vascular cryptogams in the northeastern United States and Eastern Canada.—A. E. Porsild.

NOTES AND OBSERVATIONS

CHUCK-WILL'S WIDOW IN NEW BRUNSWICK. — Moore in his "List of New Brunswick Birds" (1928) referred to Chuck-Will's Widow, *Caprimulgus carolinensis* Gmelin, as "rare — taken at Saint John", but gave no details. As this is such an unusual report I would like to place the exact information on record. Only one specimen has ever been taken in New Brunswick as far as can be ascertained and this was taken alive, injured and unable to fly at Seaside Park, West Saint John, on May 20, 1916. This specimen was mounted and is now in the collection of the New Brunswick Museum. — W. AUSTIN SQUIRES, New Brunswick Museum, Saint John, N.B.

THE LOUISIANA HERON IN NEW BRUNSWICK — Since taking charge of the Natural Science collections at the New Brunswick Museum several years ago I have discovered a number of interesting specimens which have never, or at most very imperfectly, been recorded in the literature. Foremost among these are two specimens of the Louisiana Heron *Hydranassa tricolor ruficollis* (Gosse).

The first of these was taken at Hammond River, near Nauwigewauk, Kings County, New Brunswick, in the month of April, 1895, by Dr. L. A. Langstroth of Saint John. This is the first specimen of this heron ever collected in Canada. The second specimen was collected at little River in Saint John County just east of the City of Saint John, and about fifteen miles from the first locality. It was also collected in the month of April, about 1920, by Andrew L. MacIntosh of Quispamsis, N.B.

It is too bad that these records had not been published earlier when more exact dates could have been ascertained. Both of the collectors are now dead and as they both were sportsmen rather than naturalists no records other than what is given here are now available.

The A.O.U. Check-list (1931) states that this Louisiana Heron migrates casually northward in late summer as far as New York, so

it is well to note that both of these were taken in April. In the case of the American Egret and other allied stragglers from the south, at least as many have been recorded in New Brunswick in April, May and June as in the late summer and fall.—W. AUSTIN SQUIRES, New Brunswick Museum, Saint John, N.B.

THE WOOD THRUSH IN NEW BRUNSWICK — I have already published (Acadian Naturalist, 1945) the New Brunswick records in the James S. Lord collection of birds' eggs which included a set of eggs of the Wood Thrush *Hylocichla mustelina* (Gmelin) at St. Stephen, N.B., May 28, 1918. This is, however, so much farther to the northeast than the range given in the A. O. U. check-list (1931) that confirmatory evidence seems called for.

There are two specimens without date in the New Brunswick Museum collection which the former director, Dr. William MacIntosh, assures me were collected locally. He was, moreover, quoted in the Education Review (Saint John, 1935) as stating that one of them was taken near Loch Lomond some years before.

Dr. George M. Young of Fredericton, who has had a life-long interest in birds, has told me that he identified a Wood Thrush at St. Stephen about 1920 while in the company of James S. Lord.

Miss Willa MacCoubrey, who is also a very accurate observer, wrote me that about 25 years ago the Wood Thrush nested not uncommonly together with the Olive-backed and Hermit Thrushes where she lived just outside of St. Andrews. She reported that of late years it has been very scarce, the only recent record being one seen June 1, 1941.

As George A. Boardman never recorded it during his sixty years of intensive study in the St. Stephen region it must have been extremely rare or absent at that time. — W. AUSTIN SQUIRES, New Brunswick Museum, Saint John, N.B.

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